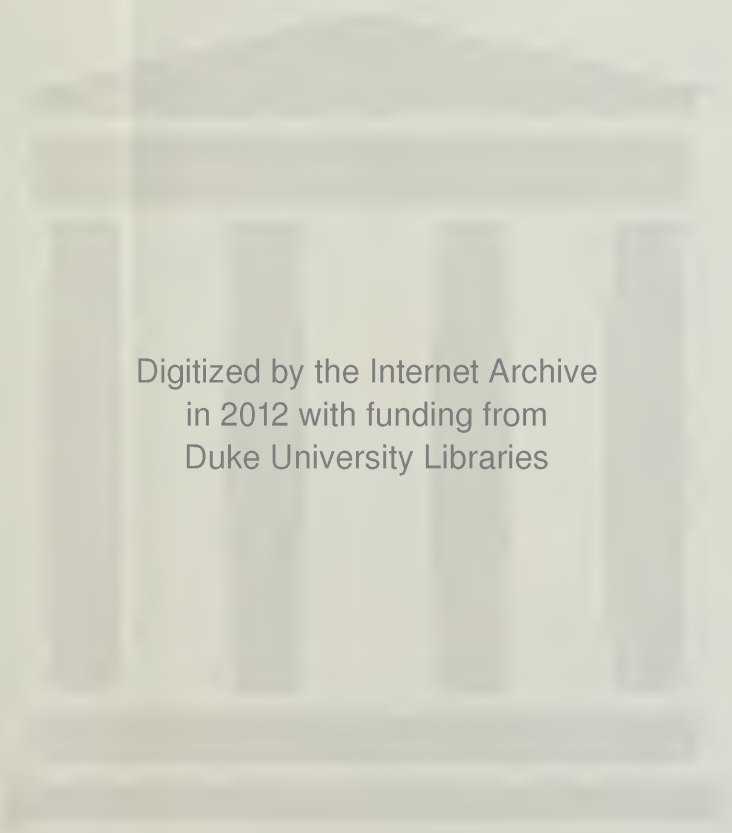


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BULLETIN OF DUKE UNIVERSITY

The Divinity School
1966

Annual Bulletins

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Published by Duke University monthly except in July, August, September, and December. Entered as second-class matter March 25, 1929, at the Post Office of Durham, North Carolina, under the Act of August 24, 1912.

Statement of Ownership, Management, and Circulation

Date of Filing: May, 1966

Title of Publication: Bulletin of Duke University.

Frequency of Issue: 13 per calendar year.

Location of Known Office of Publication: 111 Allen Building, Duke University, Durham, North Carolina.

Location of the Headquarters or General Business Offices of the Publishers: Same.

Name and Address of Publisher: Duke University, Durham, North Carolina.

Name and Address of Editor: Dr. Richard L. Tuthill, Registrar, Duke University, Durham, North Carolina.

Name and Address of Managing Editor: Mrs. Sandra Simmons, Assistant to the Registrar, Duke University, Durham, North Carolina.

Owner: Duke University, Durham, North Carolina.

Known Bondholders, Mortgages, and Other Security Holders: None.
(Act of October, 1962: Section 4369. Title 39 U.S. Code)

BULLETIN OF DUKE UNIVERSITY

The Divinity School
1966

Durham, North Carolina 1966

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Calendar of the Divinity School

1966

September

- 15 Thursday—Dormitories open for occupancy
- 17 Saturday—Junior Orientation begins
- 19 Monday, 12:30 p.m.—Faculty luncheon
- 19 Monday, 4:00 p.m.—Faculty meeting
- 20 Tuesday, 9:00 a.m.-1:00 p.m.—Registration of returning students
- 20 Tuesday, 9:00 a.m.-1:00 p.m.—Photographing of new students
- 20 Tuesday, 9:30 a.m.-10:30 a.m.—Library tours for new students
- 20 Tuesday, 2:00 p.m.-5:00 p.m.—Registration of new students
- 20 Tuesday, 7:00 p.m.-9:00 p.m.—Testing of new students
- 21 Wednesday, 9:00 a.m.-1:00 p.m.—Completion of registration
- 21 Wednesday, 9:00 a.m.-11:00 a.m.—Library tours for new students
- 21 Wednesday, 2:00 p.m.-5:00 p.m.—Testing of new students
- 21 Wednesday, 8:00 p.m.—University Convocation
- 22 Thursday, 8:10 a.m.—Fall semester classes begin
- 22 Thursday, 10:10 a.m.—Opening Convocation
- 28 Wednesday—Last day for changing courses for the fall semester

October

- 31 November 2—The Christian Convocation and Gray Lectures

November

- 23 Wednesday, 5:30 p.m.—Thanksgiving recess begins
- 28 Monday, 12:00 noon—Classes resume

December

- 11 Sunday—Founders Day
- 16 Friday, 5:30 p.m.—Christmas recess begins

1967

January

- 2 Monday, 8:10 p.m.—Classes resume

- 11-12 Wednesday, Thursday—Registration of resident students for spring semester
- 13 Friday—Fall semester classes end
- 17 Tuesday—Final examinations begin
- 27 Friday—Final examinations end
- 31 Tuesday—Registration of new students

February

- 2 Thursday, 8:10 a.m.—Spring semester classes begin
- 8 Wednesday—Last day for changing courses

March

- 24 Friday, 5:30 p.m.—Spring recess begins

April

- 3 Monday, 12:00 noon—Classes resume
- 19-29 Pre-registration for fall semester

May

- 3 Wednesday, 11:00 a.m.—Dean's address to senior class
- 17 Wednesday, 11:00 a.m.—Closing Convocation
- 19 Friday, 5:30 p.m.—Spring semester classes end
- 22 Monday, 2:00 p.m.—Final examinations begin
- 31 Wednesday, 5:00 p.m.—Final examinations end

June

- 2 Friday, 10:30 a.m.—Faculty meeting
- 2 Friday, 12:30 p.m.—Faculty Luncheon
- 3 Saturday—Commencement begins
- 4 Sunday, 11:00 a.m.—University Baccalaureate service
- 4 Sunday, 7:45 p.m.—Divinity School Baccalaureate service
- 5 Monday—Commencement—conferral of degrees

Officers of Administration

Douglas Maitland Knight, Ph.D., LL.D., Litt.D., L.H.D., *President of the University*

Robert Taylor Cole, Ph.D., *Provost*

Gerhard Chester Henricksen, M.A., C.P.A., *Vice President for Business and Finance and Treasurer*

Everett Harold Hopkins, M.A., LL.D., *Vice President for Planning and Institutional Studies and Assistant Provost*

Frank Leon Ashmore, A.B., *Vice President for Institutional Advancement*

Charles Edward Jordan, A.B., LL.D., *Vice President for University Relations*

Frank Traver de Vyver, Ph.D., *Vice Provost*

Harold Walter Lewis, Ph.D., *Dean of Arts and Sciences and Vice Provost*

Barnes Woodhall, M.D., *Vice Provost*

Benjamin Edward Powell, Ph.D., *Librarian*

Richard Lovejoy Tuthill, Ed.D., *University Registrar*

Craufurd David Goodwin, Ph.D., *Secretary*

Edwin Constant Bryson, LL.B., *University Counsel*

Emeriti

Hiram Earl Myers (1926), S.T.M., D.D., *Professor Emeritus of Biblical Literature*

H. Shelton Smith (1931), Ph.D., D.D., Litt.D., *James B. Duke Professor Emeritus of American Religious Thought*

Hersey Everett Spence (1918), A.M., B.D., D.D., Litt.D., *Professor Emeritus of Religious Education*

Arley John Walton (1948), B.S.L., D.D., *Professor Emeritus of Church Administration and Director of Field Work*

Educational Administration

Robert E. Cushman (1945), B.D., Ph.D., L.H.D., *Dean of the Divinity School*

Osmond Kelly Ingram (1959), B.D., *Dean of Students*
Donald J. Welch (1965), B.D., *Assistant to the Dean*
Fletcher Nelson (1964), B.D., D.D., *Assistant to the Dean for Development*
Helen Mildred Kendall (1950), A.B., *Administrative Assistant and Registrar*
William Arthur Kale (1952), B.D., D.D., *Director of Field Education*
Daniel M. Schores, Jr. (1965), B.D., Ph.D., *Associate Director of Field Education*
M. Wilson Nesbitt (1958), B.D., D.D., *Director of the Work of the Rural Church under the Duke Endowment*
Mattie Belle Powell (1959), *Administrative Assistant for the Work of the Rural Church and Student Financial Aid*

Division of Advanced Studies

Waldo Beach (1946), B.D., Ph.D., *Director of Graduate Studies in Religion*
McMurry S. Richey (1954), B.D., Ph.D., *Director of the Master of Theology Program*

Division of Special Studies

Kenneth Willis Clark (1931), B.D., Ph.D., *Co-Director, International Greek New Testament Project*
Richard A. Goodling (1959), B.D., Ph.D., *Director of Instruction in Pastoral Care*
William Arthur Kale (1952), B.D., D.D., *Director of the Master of Religious Education Program*

The Library

Donn Michael Farris (1950), B.D., M.S. in L.S., *Librarian*
Harriet V. Leonard (1960), B.D., M.S. in L.S., *Reference Librarian*
Patricia Reynolds, B.A., *Circulation Librarian*
Carolyn London, *Assistant Circulation Librarian*

Faculty

P. Wesley Aitken (1963), B.D., Th.M., *Assistant Professor of Pastoral Care and Chaplain Supervisor*

*Hugh Anderson (1957), M.A., B.D., Ph.D., *Professor of Biblical Criticism and Theology*

†Frank Baker (1960), B.D., Ph.D., *Professor of English Church History*

†Waldo Beach (1946), B.D., Ph.D., *Professor of Christian Ethics*

Kenneth Willis Clark (1931), B.D., Ph.D., *Professor of New Testament*

Robert B. Claytor (1963), B.D., Th.M., *Instructor in Pastoral Care and Chaplain Supervisor*

James T. Cleland (1945), M.A., S.T.M., Th.D., D.D., *James B. Duke Professor of Preaching*

Robert E. Cushman (1945), B.D., Ph.D., *Professor of Systematic Theology*

William David Davies (1966), B.D., M.A., D.D., *George Washington Ivey Professor for Advanced Studies and Research in Christian Origins*

James Michael Efird (1962), B.D., Ph.D., *Assistant Professor of New Testament*

Donn Michael Farris (1950), B.D., M.S. in L.S., *Associate Professor of Theological Bibliography*

†Richard A. Goodling (1959), B.D., Ph.D., *Associate Professor of Pastoral Care*

Egil Grislis (1959), B.D., Ph.D., *Associate Professor of Historical Theology*

Thor Hall (1962), B.D., Ph.D., *Assistant Professor of Preaching and Theology*

John Kennedy Hanks (1954), M.A., *Associate Professor and Lecturer in Sacred Music*

Stuart C. Henry (1959), B.D., Ph.D., *Professor of American Christianity*

Frederick Herzog (1960), Th.D., *Associate Professor of Systematic Theology*

*Resigned, August 1966.

†On sabbatical leave, Fall Semester, 1966-67.

Hans J. Hillerbrand (1959), Ph.D., *Associate Professor of Modern European Church History*
 Osmond Kelly Ingram (1959), B.D., *Associate Professor of Applied Theology*
 William Arthur Kale (1952), B.D., D.D., *Professor of Christian Education*
 *Creighton Lacy (1953), B.D., Ph.D., *Professor of World Christianity*
 M. Wilson Nesbitt (1958), B.D., D.D., *Associate Professor of the Work of the Rural Church*
 Ray C. Petry (1937), Ph.D., LL.D., *James B. Duke Professor of Church History*
 William Hardman Poteat (1960), B.D., Ph.D., *Professor of Christianity and Culture*
 McMurry S. Richey (1954), B.D., Ph.D., *Professor of Theology and Christian Nurture*
 Charles K. Robinson (1961), B.D., Ph.D., *Assistant Professor of Philosophical Theology*
 Charles Allen Rogers (1965), B.D., *Instructor in Historical Theology*
 John Jesse Rudin, II (1945), B.D., Ph.D., *Associate Professor of Speech and Worship*
 Daniel M. Schores, Jr., B.D., *Assistant Professor of Church and Society*
 Dwight Moody Smith, Jr. (1965), B.D., Ph.D., *Associate Professor of New Testament*
 Harmon L. Smith (1962), B.D., Ph.D., *Assistant Professor of Christian Ethics*
 William Franklin Stinespring (1936), M.A., Ph.D., *Professor of Old Testament and Semitics*
 *John Strugnell (1960) M.A. (Oxon.), *Assistant Professor of Old Testament*
 Gene M. Tucker (1966), B.D., Ph.D., *Assistant Professor of Old Testament*
 Donald S. Williamson, B.D., Ph.D., *Assistant Professor of Pastoral Care*
 Rajah B. Manikam (1966), B.D., Ph.D., *Visiting Professor of World Christianity*

Harry B. Partin (1964), B.D., Ph.D., *Lecturer in History of Religions*
 Herbert P. Sullivan (1960), B.D., Ph.D., *Lecturer in History of Religions*
 Orval Wintermute (1959), B.D., Ph.D., *Lecturer in Old Testament*

William R. Goodman, Jr., (1966), B.D., *Teaching Assistant in Old Testament*
 Allen Freeman Page, B.D., *Teaching Assistant in Greek*
 Charles L. Rice, B.D., *Instructor in Preaching*

*On sabbatical leave, 1966-67.

John C. Detwiler (1966), B.D., Th.M., *Chaplain Supervisor and Lecturer in Pastoral Care*
William C. Spong (1965), B.D., Th.M., *Chaplain Supervisor and Lecturer in Pastoral Care*
William R. Steininger (1960), B.D., S.T.M., *Chaplain Supervisor and Lecturer in Pastoral Care*

Secretarial Staff

Marie C. Broadwell, *Secretary to the Assistant to the Dean*
Linda S. Chandler, *Secretary for the Rural Church*
Mary Chestnut, *Faculty Secretary*
Vivian Crumpler, *Faculty Secretary*
Rose Marie Davis, A.B., *Secretary to the Director of Graduate Studies in Religion*
Leslie Grey Harper, A.B., *Faculty Secretary*
Linda Jones, B.S.C., *Secretary to the Director of Field Education*
Helen R. Rearden, *Secretary to the Dean*
Kay Rundell, *Secretary to the Registrar*
Patricia M. Smith, *Secretary to the Dean of Students*
Iris Zimmerman, *Faculty Secretary*

Divinity School Committees

Administrative

Policy and Appointments: Cushman, *ex officio*, Beach, Cleland, Kale, Henry, Petry, Richey, Stinespring

Endowment and Field Education: Kale, Farris, Goodling, Hall, Ingram, Nesbitt, Schores

Registration and Advanced Standing: Stinespring, Efird, Ingram, Schores, Welch, Kendall, *ex officio*

Scholarship and Financial Aid: Cushman, *ex officio*, Hillerbrand, Ingram, Kale, Nesbitt, Schores, Powell, *ex officio*

Ministerial and Professional Qualifications: Ingram, *ex officio*, Aitken, Goodling, Grislis, Schores, Welch

Vocational Group Qualifying Finals: Grislis, Hall, Kale, Schores

Academic Affairs

Academic Standing: Cushman, *ex officio*, Efird, Farris, Ingram, Henry, Herzog, Kale, Schores, Stinespring, Kendall, *ex officio*

Admissions: Cushman, *ex officio*, Efird, Grislis, Ingram, Kale, Robinson, M. Smith, Schores, Kendall, *ex officio*

Continuing Education: Henry, Efird, Hall, Kale, Nesbitt, H. Smith, Welch, Williamson

Curriculum: Richey, Grislis, Henry, Poteat, Herzog, H. Smith, Petry, M. Smith, Stinespring, Cushman, *ex officio*

Library Resources: Farris, *ex officio*, Baker, Grislis, Herzog, Petry, Rogers, H. Smith, Tucker

Master of Theology: Hillerbrand, Efird, Goodling, Petry, Poteat, Robinson

Master of Religious Education: Kale, *ex officio*, Hall, Herzog, Richey, Schores

Joint and Special Committees

Alumni Affairs: Welch, *ex officio*, Ingram, Nelson, H. Smith, Schores

Chapel Worship and Christian Life: Hall, Herzog, Hanks, Cleland, Kale, Rudin, M. Smith

Christian Responsibility and Cultural Trends: Herzog, Efird, Poteat, Robinson, H. Smith, Williamson

Community and Social Events: Ingram, Clark, Claytor, Goodling, Grislis, Hall, Rudin, Schores, H. Smith, Stinespring, Welch

Convocation: Richey, *ex officio*, Cleland, Hanks, Nelson, Welch

Divinity School Review: Farris, Baker, Efird, Grislis, Henry, Poteat, Robinson, H. Smith, Tucker, Williamson

Lectures and Public Events: Cleland, Beach, Clark, Poteat, M. Smith, Tucker, Welch

James A. Gray: Cleland

Divinity School Seminars: Clark, Poteat, Richey, M. Smith

Assembly Program: Welch

Missions Symposium: H. Smith

School for Approved Supply Pastors: Kale, Goodling, Rudin, Schores, Welch

St. Michael's (Dumfries) Associates: Cleland, Ingram, Farris, Stinespring



General Information

Historical Statement

The indenture of Trust signed on December 11, 1924, by Mr. James B. Duke, which established Duke University, mentioned first among its objects the training of ministers of the Gospel. The Divinity School was, accordingly, the first of the graduate professional schools to be organized. Its work began with the year 1926-1927, the formal opening exercises being held on November 9, 1926.

The Reverend Doctor Edmund Davison Soper was the first Dean of the Divinity School. He resigned in 1928 to become President of Ohio Wesleyan University, and was succeeded by the Reverend Doctor Elbert Russell, and the latter in turn in 1941 by the Reverend Doctor Paul Neff Garber. In 1944, Dean Garber was elected to the episcopacy of The Methodist Church, and Doctor Harvie Branscomb assumed the duties of the Dean's office. In 1946, Dean Branscomb became Chancellor of Vanderbilt University, and in 1947 the Reverend Doctor Paul E. Root was elected Dean but died before he could assume the office. The Reverend Doctor Harold A. Bosley became Dean in 1947 and resigned in 1950 to become the pastor of the First Methodist Church, Evanston, Ill. The Reverend Doctor James Cannon was appointed Dean of the Divinity School, March 1, 1951. After a period marked by important administrative integration of the School, Doctor Cannon resigned the duties of deanship, September 30, 1958. The Reverend Professor Robert Earl

Cushman was elected Dean and assumed the responsibilities of the office on October 1, 1958.

The Purpose of the Divinity School

The primary purpose of the Divinity School is to provide training for properly qualified persons planning to enter the Christian ministry. This includes not only prospective ministers in local churches, but also those preparing themselves to be missionaries at home and abroad, ministers of Christian Education, teachers of religion, and chaplains. Vital to all of these forms of service is a full understanding of the beginnings, content, and history of the Christian faith and its special pertinence for the spiritual needs of the modern world. Studies of a broad and thorough character directed toward such an understanding constitute the center of the curriculum of the Divinity School and are regarded as the basic training for all prospective Christian ministers. Specific instruction in the skills required of local ministers and of leaders in the work of Christian Education is also provided. As funds become available for the purpose and as needs appear, additional training in specialized skills and areas of knowledge will be added to the curriculum.

Bound by ties of history and obligation to The Methodist Church, the Divinity School is ecumenical in its interests and outlook. Its faculty is limited to no one denomination, but draws upon the resources of them all. Students of the several denominations are admitted on an equal basis. The Divinity School conceives its task to be one of broad service to the Church in all of its forms.

The Relation of the Divinity School to Duke University

The Divinity School is an integral part of the University and shares fully in its activities, privileges, and responsibilities. The Sunday services in the University Chapel give Divinity School students an opportunity to hear each year a number of leading ministers of the country. The University Libraries make easily accessible a rich collection of 1,750,000 volumes. Selected courses in the Graduate School of Arts and Sciences and in the professional schools are open to Divinity School students without payment of additional fees. The general cultural and recreational resources of the University are available to them on the same basis as to other students.

Courses of Study Offered by the Divinity School

The Divinity School offers three courses of study. The basic course is that which leads to the degree of Bachelor of Divinity. This is a three-

year course and is recommended to all those preparing themselves for the work of the parish ministry. Students who hold pastoral charges, or other remunerative work requiring any substantial time apart from their studies, may carry only reduced schedules of work, and, in most cases, unless work is taken in the Duke University Summer Session, will spend four years in completion of the requirements for the B.D. degree.

The Divinity School offers study leading to the degree of Master of Religious Education. This course is designed for persons who wish to take specialized positions in the work of Christian Education. The course does not provide a general preparation for the work of the regular ministry and cannot serve as a substitute for it. No exchange of credits between the two courses is permitted, nor can departmental courses taken be credited toward more than one degree.

A new program of study leading to the degree of Master of Theology (Th.M.) was instituted in the academic year 1960-1961. This course is planned to afford a limited number of superior students an opportunity for intensive theological study beyond the B.D. degree. It is a terminal professional degree, ordinarily to be completed in a year, and not to be regarded as leading toward a doctorate.

The requirements for each of these degrees are stated on pages 20 through 35 of this catalogue.

Courses of Study in Religion Offered by the Graduate School of Arts and Sciences

Students who desire to pursue studies in religion leading to the degrees of Master of Arts or Doctor of Philosophy in Religion should register in the Graduate School of Arts and Sciences. Study and research may be pursued in three fields: (1) Biblical Studies; (2) Historical Studies; and (3) Systematic and Contemporary Studies. A list of courses approved by the Graduate School faculty for work in these fields, together with general requirements for admission to the Graduate School, may be found in the *Bulletin of the Graduate School*. This Bulletin is available on application to the Dean of the Graduate School of Arts and Sciences, Duke University.

Graduate students in religion are eligible for financial support under a regular University Fellowship, a Gurney Harriss Kearns Fellowship in Religion, administered by the Graduate School, or for one of the National Foundation fellowships such as Rockefeller, Woodrow Wilson, or Danforth. Applications for fellowships administered by Duke University should be submitted to the Dean of the Graduate School by February 15.

Inquiries concerning specific requirements of the Program of Religion in the Graduate School should be addressed to Professor Waldo Beach, Director of Graduate Studies in Religion.

Facilities for Study

Library Resources

Divinity School Library

The Divinity School Library, containing a collection of more than 125,000 volumes in the field of religion and closely related disciplines, affords an unusual wealth of material for the seminary student. Although it is an integral part of the University's nine-unit library system which possesses more than 1,750,000 books, the Divinity School Library has its own separate facilities in the Divinity School building. Its book collection is operated on the open stack system, and its reading room provides study facilities for students, housing space for the special reference collection in religion, and for the current numbers of the more than 460 religious periodicals to which the Library subscribes.

Staffed by a librarian and a reference librarian who are trained in theology as well as in library administration, and by a circulation staff of two persons aided by a number of student assistants, the Divinity School Library offers a variety of reference services to assist the student in selecting and locating materials. The staff, in cooperation with the faculty, maintains a book and periodical collection to support both basic courses and advanced research in all major fields of religious studies.

The Divinity School Library is adjacent to the General Library and is internally connected with it by a corridor which gives easy access to its many departments. The seminary student is permitted to withdraw books from the collection of more than 1,000,000 volumes in the General Library, and to make use of its other resources and facilities which include manuscripts, archives, public documents, newspapers, periodicals, microfilm, maps, rare materials (among which are thirty prized ancient Greek manuscripts), reference assistance, and provision for the borrowing of books not in the Duke Libraries from the Library of the University of North Carolina and other institutions.

Ormond Memorial Fund

Established in 1924 by Dr. J. M. Ormond, '02, and Mrs. Ormond, in memory of his mother and father, Mr. and Mrs. J. J. Ormond, the income from the Ormond Memorial Fund is to be used for the purchase of a collection of books on the rural church for the Library of the Divinity School at Duke University.

Avera Bible Fund

Established in 1895 by gift of Mrs. L. B. McCullers in memory of her

husband, Willis H. Avera, the fund provides for the purchase of books to be used for the Divinity School Library.

Louis W. Bailey Memorial Fund

This memorial fund was established in 1958 by the Reverend A. Purnell Bailey in memory of his father. The income is to be used for books for the Divinity School Library.

The William Arthur Kale, Jr., Memorial Fund

William Arthur Kale, Jr. was a member of the Duke University class of 1958, a lover of sacred art and music, and a member of the University Chapel Choir. In his memory, there was established in 1964, by the provision of his parents, Professor and Mrs. William Arthur Kale, Sr., a fund for the purchase of books and other materials in the area of fine arts and religious musicology for the perpetual enrichment of the holdings of the Divinity School Library.

Corporate Worship

One of the most important aspects of a program of training for Christian service is warm and discriminating common prayer. The center of the corporate life of the Divinity School is its own place of worship, York Chapel. Regular chapel services are held, at which all students are expected to be present. Services are led by members of the faculty, by visiting ministers, and by members of the student body. Prayer groups are held in the dormitories weekly and special groups during the Lenten Season.

Public Lectures

The Committee on Lectures and Public Events presented the following lecturers (with their topics) during the year 1965-66: Professor Franklin W. Young, Chairman of the Graduate Department of Religion, Princeton University ("The New Testament and Worship"); Dr. Joachim Jeremias, Professor of New Testament, Göttingen University, Germany ("Some Characteristics of Jesus' Way of Speaking"); Dr. Hans Frei, Associate Professor of Religious Studies, Yale University ("The Quest for Christ's Presence in T. S. Eliot's 'Murder in the Cathedral'"); Dr. Alexander A. Di Lella, O.F.M., Professor of Old Testament and N. T. Greek, Holy Name

College, Washington, D.C. ("Conservative and Progressive Theology in the Apocrypha"); The Reverend Dr. Alan F. Geyer, Executive Secretary, the Council for Social Action of the United Church of Christ ("Christianity and Political Ethics"); Mr. William Stringfellow, Counsellor at Law, New York City ("Redemptive Love"). The fifth Faculty Lecture was delivered by Professor Frank Baker ("John Wesley's First Wife").

Lectures and Symposia

The James A. Gray Lectureship

The James A. Gray Lectures were established in 1950 as part of the fund set up in 1947 by Mr. James A. Gray of Winston-Salem, North Carolina. This lectureship was once again delivered in connection with the Ministers' Convocation, held at the University in the Fall of 1965. The lecturer was The Reverend Doctor H. Shelton Smith, James B. Duke Professor Emeritus of American Thought, Duke Divinity School. His subject was: "The Role of the Southern Churchman in the Struggle for Justice and Equality: 1820-1965." The lectures will be published.

The Divinity School Library Lectureship

In 1948 the Duke Divinity School Library Lectures were established by the Reverend George Brinkmann Ehlhardt for the purpose of bringing to the Divinity School a succession of religious leaders. The lecturer for 1965-66 was Dr. Elizabeth Sewell, author and poet, of Newnham College, Cambridge University, England.

Symposium of Christian Missions

Each year, in collaboration with the Methodist Board of Missions, the Divinity School presents a team of distinguished participants in the world mission of the Church, usually including a secretary of missionary personnel and a Duke alumnus serving overseas. The general aims are "to inform students and faculty of the philosophy and work of missions as seen through the personal experience of speakers; to educate present and future ministers so that they will have a vital concern for the promotion of missionary education in the local church; and to evaluate the missionary enterprise as a significant force in the revolutionary world." The featured speaker in 1966 was Mrs. Porter Brown, General Secretary of the Methodist Board of Missions; the alumnus was the Rev. George Ogle, '54, of Korea.

Programs of Continuing Education

Divinity School Seminars

The Divinity School, with the support of the James A. Gray Fund, conducts each year a series of extension seminars consisting of two-day study courses for Divinity School alumni and other ministers. In 1965-66 three seminars were held as follows: Columbia, S. C., in College Place Methodist Church (November 15-16, 1965); Gastonia, N. C., in First Methodist Church (January 17-18, 1966); and Goldsboro, N. C., in St. Paul Methodist Church (January 19-20, 1966). The subject presented in all three Seminars was "Moral Responsibility and the Christian."

Lecturers were Dr. Hans W. Frei, Associate Professor of Religious Studies in Yale University; Dr. Donald W. Shriver, Jr., Assistant Professor of Social Studies and Director of the Experimental Study of Religion and Society in North Carolina State University at Raleigh; and Dr. William H. Poteat, Associate Professor of Christianity and Culture in the Divinity School of Duke University.

Projected for 1966-67 are seminars in Florence, S.C., Charlotte, N.C., Wilson, N. C., and (for the first time) Richmond, Va. The subject will be: "The Sequel to Vatican II." Dean Robert E. Cushman, Observer at the sessions of Vatican II, will lead a team of specialists in these seminars.

The Henry Harrison Jordan Loan Library

Henry Harrison Jordan, distinguished member of the Western North Carolina Conference (1862-1931) was memorialized by his children in the establishment of an endowment in 1947. The Divinity School librarian is the custodian of books purchased under this fund for loan, through postal services, to qualified ministers of all denominations or localities. The Jordan Loan Library undertakes to maintain a catalogue of up-to-date publications representative of the several theological disciplines and areas of the minister's professional interest. Books are loaned on application to the librarian of the Divinity School from a printed catalogue supplied on request.

Duke Divinity School Summer Clinics

Four Summer Clinics in Church Planning and Development, Pastoral Care, Preaching, and Systematic Theology will be held simultaneously on July 18-29, 1966. These are designed to supplement Seminary education through two weeks of intensive training in one selected subject. Each clinic has its own leaders and schedule. However, the four groups will be together for special features, particularly the guest lectures of the second week. Registration is open to ministers of all denominations. Participants are expected to attend the full two weeks from the opening dinner to the closing luncheon. No academic credit is given. Please address requests for information, costs and financial aid to: Dr. M. Wilson Nesbitt, Director and Registrar, Box 4814, Duke Station, Durham, North Carolina.

Church Planning and Development

This Summer Clinic is designed to acquaint church leaders with the rationale and methodology of the "planning process," applying it to such church situations as church extension, conference structure, parish planning and programming, research-survey, and cooperative work both in urban and rural settings. *Dr. Daniel M. Schores, Jr., Faculty Chairman.*

Pastoral Care

The theme is the psychological and theological dimensions of selfhood. Through lectures, discussions, hospital visitation, and verbatim conferences, aspects of the theme are explored: the meaning of selfhood, the self in crisis and the ministry of the Church to those caught in the crisis of illness, the action of God in the midst of suffering, and the personal and sacramental means of grace. Hospital visitation supervised by the

Chaplains to the Duke Medical Center forms an integral part of the program. *Dr. Richard A. Goodling, Faculty Chairman.*

Preaching

This Clinic will focus on principal and practical aspects of sermon planning, preparation, and presentation, particularly in the area of sermon construction and delivery. Opportunity is provided for each participant to preach at least twice before a small group for criticism. Matters of common concern for preachers are discussed in plenary sessions. Registration is limited to eighteen members, preferably active ministers and chaplains, who have been out of the seminary five years or more. *Dr. James T. Cleland, Faculty Chairman.*

Systematic Theology

Discussion at this Clinic will treat current and controverted issues in present-day Protestant theology as these are illustrated by "radical" and "social change" theology. There will be lectures, assigned reading, group conferences. *Dr. Frederick Herzog, Faculty Chairman.*

The School for Supply Pastors

In cooperation with the Department of Ministerial Education of the Board of Education and the Southeastern Jurisdictional Conference of The Methodist Church, Professor W. A. Kale directs for the Divinity School a School for Supply Pastors of The Methodist Church and others taking the Methodist course of study for ministers. This school is in session for approximately four weeks each summer, and the required studies for one full year can be completed in this period. This is not a part of the regular work of the Divinity School and no credit toward a seminary degree can be earned. The faculty includes representatives from the Divinity School and other church-related institutions, plus selected leaders of nearby Annual Conferences. The eighteenth session of the Supply Pastors' School is scheduled for July 11-August 5, 1966.

Other Programs

Facilities for Advanced Study in the American Schools of Oriental Research

The Divinity School of Duke University is one of the supporting members of the American Schools of Oriental Research. Accordingly, students

in the Divinity School have the privilege of attending the American School in Jerusalem or the one in Bagdad without charge for tuition. They may also compete for the financial aids which are offered annually by these Schools, which consist of four fellowships, the stipends depending upon available funds.

Programs in Pastoral Care

Programs in Pastoral Care beyond the studies incorporated in the B.D. curriculum are provided in cooperation with the Duke University Medical Center, Murdoch Center in Butner, and Dorothea Dix Hospital in Raleigh. The staff for these programs consists of faculty members in Pastoral Care of the Divinity School and the Chaplains of the cooperating hospitals.

Five such special programs are available:

1. A quarter of Clinical Pastoral Training is available to a limited number of B.D. and post-B.D. students beginning the Monday nearest June 15 and continuing for twelve consecutive weeks. This quarter of training is accredited by the Institute of Pastoral Care, Inc.
 2. The Master of Theology degree with a major in Pastoral Care is a calendar year program beginning June 15th, September 15th, or February 1st, and includes a summer quarter of clinical training full-time in one of the affiliated hospitals with such clinical training continuing on a half-time basis through the academic year. To the 14 credits the candidate receives for his clinical training are added 16 credits for course work in The Divinity School. (See pages 34 and 35 of *The Divinity School Bulletin* for 1966-67 for general requirements for the degree and course work in Pastoral Care.) Some money for tuition scholarship is available and several traineeships are provided through the cooperating hospitals.
 3. A one-year certificate or non-degree program is available for a limited number of candidates who hold the B.D. degree. These candidates are enrolled as special students in The Divinity School and may take a course or two each semester but the focus of their training is clinical.
 4. A second or residency year is available for those men who have either the Master's degree in Pastoral Care or have completed an internship year. The residency may be taken at any one of the three cooperating hospitals. Fellowships are available.
 5. A two-week clinic in Pastoral Care is provided each summer as part of the Divinity School's in-service training program. See p. 8.
- For further information concerning any of these programs write to Dr. Richard A. Goodling, Director, Programs in Pastoral Care, The Duke Divinity School.

Community Life

Divinity School Choir

A student organization of long standing is the Divinity School Choir. Membership in the Choir is open to all qualified students. The Choir sings regularly for the daily services in York Chapel and at special seasonal programs and services. New members are chosen by informal auditions held during the first week of fall classes. Auditions are arranged for all who are interested.

The Coordinating Council for Community Life

Beginning with the 1964-65 academic year, the Student Government Association was superseded by a Coordinating Council for Community Life. This Council is composed of representatives from the student body, faculty, administration, Divinity Dames, and the doctoral students in religion.

The purpose of the Council is, as the name implies, to coordinate the activities of the Divinity School community. Realizing that there are many shared interests and concerns within the community which cannot be expressed fully in a student body organization alone, the Council was

created by a joint student-faculty committee and approved by participating groups.

The shared interests and activities of the community are expressed through the several committees of the Council. The Council has coordinating, reviewing, and initiating powers in matters affecting the common life.

Student members of the Council are elected by the three B.D. classes, the M.R.E. candidates, the Th.M. candidates, and the student pastors. A student activity fee is collected at the beginning of each academic year to support the activities of the community. The fee, in recent years, has been six dollars (\$6.00). The funds are administered through committees and are spent on such projects as missions, social action, social events, and student publications.

Organizations

Divinity Dames

The wives of Divinity School students have an organization through which there is opportunity for informal fellowship during the period of the students' residency. For the past several years lecture courses, running for two-week periods in the fall and spring semesters, have provided instruction in various aspects of parish life and in theological and Biblical subjects and issues. The Dean and faculty are concerned to assist the wife to understand her husband's vocation and to participate appropriately.

The Duke Endowment Student Association

The Duke Endowment Student Association is the organization of students who participate in the Summer Field Education Program.

At least six meetings per year are held for the purpose of fellowship and preparation for the summer field education responsibilities.

Publications

The Duke Divinity School Review

Three times each year (Autumn, Winter, and Spring) the Divinity School publishes a magazine designed to acquaint its readers with current theological thinking through the inclusion of public addresses given at the school, scholarly articles by faculty members and others, and book

reviews. The *Review* is circulated free of charge to a mailing list of some 2,600, one-half of whom are alumni of the School and the other half are interested friends, campus ministers, teachers, administrators, and librarians.

Directory and Response

In cooperation with the Dean's Office, students publish a faculty and student *Directory*. A monthly paper entitled *Response* is published under their editorship.

Admission and Requirements for Degrees

Requirements and Procedures for Admission

The Divinity School is a fully accredited member of the American Association of Theological Schools, and is one of twelve accredited seminaries of The Methodist Church. Candidates for admission must hold the degree of A.B., or its equivalent, based upon four years of work beyond secondary education in a college which is approved by one of the regional accrediting bodies, and their college records must be such as to indicate their ability to carry on graduate professional studies. They will be admitted without examination on presentation of an official, satisfactory transcript of college and all other academic credits which they may have secured. Recommendations from five responsible persons are required. Women will be admitted on the same basis as men.

Applications are evaluated with a view both to the academic achievement of the candidate and with reference to his personal and professional qualifications for the Christian ministry. While an academic average of less than "B minus" is ordinarily regarded as a disqualification for admission, nevertheless, the Committee on Admissions is impressed with a rising curve of achievement in the undergraduate program and makes its decision on the basis of the whole body of credentials of an applicant, including supporting letters of reference.

The applications of students from foreign countries will be considered, each on its own merits, the general principle being that training equivalent to that of a baccalaureate degree from an accredited American college must have been secured.

In addition to an adequate academic preparation, applicants must satisfy the faculty as to their Christian character and purpose. A formal application blank may be secured from the office of the Divinity School. This must be filled out and returned by all candidates for admission. Applications received after May 1 cannot be assured of dormitory rooms for the ensuing academic year. *A minimum of thirty days is required to process any application, in many cases longer.*

No admission is final until approved by the Student Health Service, which requires a certificate of immunization and general health to be submitted not earlier than July 1 and not later than August 1.

Entering students are also required to take certain diversified tests administered by the Bureau of Testing and Guidance and by the Divinity School.

Persons who do not matriculate at the time for which they were originally admitted forfeit admission and must be formally readmitted. A student who withdraws from the Divinity School and desires to return at a later date must file with the Dean a written request for a leave of absence.

Applicants are expected on notification of admission to signify their acceptance within three weeks, and to pay an admission fee of \$30.00. (Make check payable to Duke University and send to the Office of the Dean of the Divinity School.) This fee is applied to the regular first-term bill if the student matriculates; if he fails to do so, the fee is forfeited. This does not apply to the Summer Session.

Under the terms of the Selective Service Act, as it now stands, pre-enrollment for later formal admission may be granted to persons who meet the Divinity School standards and requirements for admission. Applications for pre-enrollment may be addressed to the Office of the Dean. Pre-enrolled students must send transcripts of each year's college work by June 15th of each year in which they are pre-enrolled. Pre-enrollment does not guarantee final admission, and a person who has been pre-enrolled for any length of time must send a transcript of work by February 1 of the year in which admission is sought. This must be accompanied by a letter from the college dean or other approved reference certifying to continued academic acceptability and good character and conduct.

Recommended Pre-Seminary Curriculum

The following is regarded by the Association of American Theological Schools as a minimum list of fields with which it is desirable that a student

should have acquaintance before beginning study in seminary. These fields of study are selected because of the probability that they will lead in the direction of such results as have been indicated.

It is desirable that the student's work in these fields of study should be evaluated on the basis of his mastery of these fields rather than in terms of semester hours or credits. So that this recommendation may help the student faced with the practical problem of selecting courses, however, it is suggested that he take 30 semester courses or 90 semester hours or approximately three-fourths of his college work in the following specific areas:

English—literature, composition, speech, and related studies. At least 6 semesters.

History—ancient, modern European, and American. At least 3 semesters.

Philosophy—orientation in history, content, and method. At least 3 semesters.

Natural Sciences—preferably physics, chemistry, and biology. At least 2 semesters.

Social Sciences—psychology, sociology, economics, political science, and education. At least 6 semesters, including at least 1 semester of psychology.

Foreign languages—one or more of the following linguistic avenues to man's thought and tools of scholarly research: Latin, Greek, Hebrew, German, and French. Students who anticipate postgraduate studies are urged to undertake these disciplines early in their training as opportunity offers. At least 4 semesters.

Religion—a thorough knowledge of the content of the Bible is indispensable, together with an introduction to the major religious traditions and theological problems in the context of the principal aspects of human culture outlined above. The pre-seminary student may well seek counsel of the seminary of his choice in order most profitably to use the resources of his college. At least 3 semesters.

Of the various possible areas of concentration, where areas of concentration are required, English, philosophy, and history are regarded as the most desirable. (from *A.A.T.S. Bulletin*, 1964)

Transfer of Credit

Transfer of credit from theological schools accredited by the American Association of Theological Schools is provided for by the faculty of the Divinity School under certain conditions. Applications for transfer of credit will be ruled upon by the Committee on Admissions, and will be subject to evaluation in terms of the prevailing requirements of the Divinity School for graduation. *Ordinarily, credit from another institution will not be granted in amount exceeding one-half of the total credits*

required by the Divinity School for graduation. A student applying for transfer of credit in excess of this amount may be required to pass such examinations as the Committee on Admissions may prescribe. In each case a letter of honorable dismissal from the school from which transfer is made is required along with transcript of academic credits.

Advanced Standing

Advanced standing allows entering students to begin work in any given field at a level higher than that of the core curriculum, or to substitute a specialized or cognate course for a core requirement.

Entering students with substantial undergraduate preparation in areas closely related to required courses of the Divinity School core curriculum may be eligible for advanced standing. While a student may be eligible for advanced standing in any subject, it is especially pertinent where students offer undergraduate majors of superior quality in Bible, religion, or philosophy. Students entering with six or more semester hours in the Greek language should consult the *Bulletin* under "Language Study" for a description of special privileges pertaining to their case. The fields in which entering students, by virtue of previous undergraduate study, are most likely to qualify for advanced standing are: Old Testament, New Testament, Types of Religious Philosophy, and Church History.

An entering student who offers not less than six semester hours of college credit, with a grade of "B" or better in one or more of these areas, may ordinarily anticipate advanced standing in corresponding required courses of the Divinity School core curriculum. All final transcripts will be studied, and advanced standing will be accorded to those who qualify under this provision.

A student who offers not less than three semester hours of college credit with a grade of "B" or better in one or more of these areas may, for satisfactory performance in a qualifying examination in the discipline, be granted advanced standing. Entering students who qualify under this provision must, at the time of application, make request for the privilege of sitting for such an examination.

The core requirement for the entering junior student with advanced standing is ordinarily satisfied by one of the following substitutions:

For Old Testament 11: O.T. 101; 106 A, B, C, D; 196; 201; 202.

For New Testament 18: N.T. 103; 104; 105; 107; 109; 116 A, B, C; 117 A, B; 118; 119.

For Types of Religious Philosophy: C.C. 16.

For Church History 13: C.H. 137; 138; 331; 332.

For Church History 14: C.H. 85; 250; 330.

Admission on Probation

Applicants for admission who are graduates of non-accredited colleges will be considered on their merits. Ordinarily, such applicants must show that they have attained a superior average for a four-year college course. Admission of such persons will, in every case, be on probation.

Applicants for admission who are graduates of accredited colleges but whose college transcripts do not fully meet Divinity School standards may be admitted on probation if their recommendations otherwise justify admission.

Probation means:

1. Students who during the first year of Divinity School work maintain less than a "C" average, including one or more failures, ordinarily will be required to withdraw from the School.
2. Students admitted on probation may carry only limited schedules of work, the amount to be determined by the Dean of Students.
3. A student admitted on probation ordinarily shall not be admitted for advanced standing.

Students whose work after admission is not satisfactory may be placed on probation.

Ministerial and Professional Qualifications

All students who are admitted to academic study in the Divinity School are subject to the established order of administrative regulations of the University and the accepted standards of personal conduct it enjoins; continuance in the School is conditioned upon acknowledgment of and compliance with such regulations and standards.

In particular, the University and the Divinity School expect and require students in candidacy for degrees, leading to a ministerial vocation, not only to exemplify the dignity of their calling, but to exhibit attitude and conduct conformable with the recognized standards of their Christian profession. While no honor system relating to academic integrity is formalized within the Divinity School, application for and admission to the courses of study assume the student's assent to full compliance with recognized standards of integrity in the fulfillment of academic tasks.

On this prior understanding, therefore, the University reserves the right, and matriculation by the student is a concession to this right, to compel the withdrawal of any student whose conduct at any time is not satisfactory to the University, even though no specific charge is made against the student.

As a graduate professional school of theology, the Divinity School expects, on the part of the student, an increasing manifestation of maturity and professional purposiveness in discharge of personal and academic responsibilities appropriate to the level of advanced academic work lead-

ing to the high and exacting demands of the Christian ministry. Since personal and professional qualifications for the ministry will be considered in evaluating the candidacy of all students for degrees, students whose persons, progress, or development indicate that they are not suited to the work of the ministry will not be allowed to continue in the School.

English Deficiency

Students whose English testing scores show marked deficiency or who are reported by their instructors as deficient in English usage will be required to take Remedial English in addition to meeting other requirements for the Bachelor of Divinity degree.

Faculty Advisers

Each entering student is assigned to a faculty adviser at the time of registration and must report to his adviser. A student must consult with his adviser in order to determine his course and cannot complete his registration without the signature of his adviser. It is understood that all students will continue to consult their advisers at the time of registration throughout the period of their academic work.

Requirements for Degree of Bachelor of Divinity

Course requirements are of three kinds: Those of the core curriculum, professional courses, and practicums related to field work. Courses of the core curriculum are required of all students; the professional courses required vary with the prescription of the six Vocational Groups. Practicums are required of students engaged in regular or summer field work.

Requirements for the Junior Year

Courses of the Core Curriculum

	<i>s.h.</i>
O.T. 11. Introduction to the Old Testament I	3
C.H. 13. History of the Church to the Protestant Reformation	3
C.H. 14. History of Modern European Christianity	3
N.T. 18. Early Christian Life and Literature	3
T.S. 20. Types of Religious Philosophy*	3
H.T. 21. Theology of the Protestant Reformation	3

Professional Courses

P.S. 10. I. The Church and the Minister's Vocation	1
P.C. 26. II. Introduction to Pastoral Care	3

*Advanced standing entitles the student to elect C.C. 16 *Contemporary Western Culture*.

Field Work Practicums

Field Work Practicum I (For Student Pastors)	1
Field Work Practicum II (For Summer Endowment)	1

Requirements for the Middler Year

Courses of the Core Curriculum

O.T. 12. Introduction to the Old Testament II	3
N.T. 19. Introduction to New Testament Theology	3
W.C. 24. Philosophy of the Christian World Mission*	2
C.E. 27. Christian Ethics	3
A.C. 28. History of American Christianity	3
C.T. 32. Introduction to Christian Theology I	3
C.T. 33. Introduction to Christian Theology II	3

Professional Courses

Pr. 29. III Sermon Construction—Theory	2
Pr. 30. V Sermon Construction—Practice	1

Professional Courses III and V required of all students in Vocational Groups I, III, IV, VI, and, on occasion, II and V.

Requirements for the Senior Year

I. Professional Courses

C.Ed. 22. IV Theology and Christian Nurture	3
C.P. 23. VI The Care of the Parish	3
Pr. 31. VIII Preaching (Practice)	1

Professional Course IV required of all students in Vocational Groups, I, II, III, and VI.

Professional Course VI is required of students in Vocational Groups I, II, and IV.

Professional Course VIII is required of students in Vocational Group I.

II. Vocational Groups

Each student, not later than the end of the junior year, shall choose one of the six Vocational Groups listed on pages 25 to 27 and will meet the vocational requirements of the group chosen.

III. Vocational Qualifying Finals

Each senior student shall complete his academic program during his senior year by registering for and fulfilling the requirements of the

*Required of Vocational Groups I, II and III.

qualifying final discipline pertaining to his chosen vocational group.
(Not applicable to Group VI.)

IV. Free Electives

The student will choose a sufficient number of courses to make up the total of 90 semester hours required for graduation. Language courses count as free electives.

V. English Bible

A knowledge of the content of the English Bible requisite to the discharge of the teaching and preaching task of the Christian ministry is required and will be tested. Such proficiency must be demonstrated by the end of the student's senior year. Successful completion of Old Testament English Bible I and New Testament English Bible II (see pp. 49, 51) fulfill this requirement. A student may, however, sit for the final examinations in these courses and by passing them fulfill the requirement, in which latter case he receives no academic credit.

Suggested Distribution by Semesters of Required Courses

First (Junior) Year*

Fall Semester

Required in this Semester

	<i>s.h.</i>
10. I The Church and Minister's Vocation	1
11. Introduction to the Old Testament I	3
13. History of the Church to the Protestant Reformation	3
18. Early Christian Life and Literature	3
20. Types of Religious Philosophy†	3
Field Work Practicum I (Student Pastors)	1

Spring Semester

Required in this Semester

	<i>s.h.</i>
14. Modern European Christianity	3
21. Theology of the Protestant Reformation	3

*15 hours is the normal program, not over 16 hours may be scheduled in either semester.

†Students with Advanced Standing may enroll in C.C. 16, Contemporary Western Culture.

26. II Introduction to Pastoral Care	3
Field Work Practicum II (Summer Field Work)	1

Second (Middler) Year*

Fall Semester

<i>Required in this Semester</i>	<i>s.h.</i>
19. Introduction to New Testament Theology	3
24. Philosophy of the Christian World Mission†	2
28. History of American Christianity	3
29. III Sermon Construction—Theory	2
32. Introduction to Christian Theology	3

Spring Semester

<i>Required in this Semester</i>	<i>s.h.</i>
12. Introduction to the Old Testament II	3
27. Christian Ethics	3
30. V Sermon Construction—Practice	1
33. Introduction to Christian Theology	3

Third (Senior) Year

Fall Semester

<i>Required in this Semester</i>	<i>s.h.</i>
22. IV Theology and Christian Nurture	3
C.P. 23. VI The Care of the Parish	3
Pr. 31. VIII Preaching (Practice)	1

Schedule of Required Courses

First Year—Fall Semester

Hour	Monday	Tuesday	Wednesday	Thursday	Friday
8:10					
9:10		N. T. 18	N. T. 18	P. S. 10	N. T. 18
10:10		Chapel	Chapel	Chapel	Chapel
11:00		C. H. 13	Assembly	C. H. 13	C. H. 13
12:00	C. C. 16		C. C. 16		C. C. 16
	T. S. 20		T. S. 20		T. S. 20
2:00	O. T. 11	Practicum	O. T. 11		O. T. 11

*Professional Courses I and II required of all students. Professional Course III, required of Vocational Groups 1, 3, 4, 6, and on occasion 2 and 5. Professional Course V, required of all students in Vocational Groups 1, 3, 4, and 6, and on occasion 2 and 5. Professional Course IV, required of all students in Vocational Groups 1, 2, 3, and 6.

†Required of students in Vocational Groups 1, 2, and 3.

First Year—Spring Semester

<i>Hour</i>	<i>Monday</i>	<i>Tuesday</i>	<i>Wednesday</i>	<i>Thursday</i>	<i>Friday</i>
8:10					
9:10		C. H. 14	C. H. 14		C. H. 14
10:10		Chapel	Chapel	Chapel	Chapel
11:00			Assembly		
12:00					
2:00	H. T. 21	*Practicum	H. T. 21		H. T. 21
3:00	II P. C. 26		II P. C. 26		II P. C. 26

Second Year—Fall Semester

<i>Hour</i>	<i>Monday</i>	<i>Tuesday</i>	<i>Wednesday</i>	<i>Thursday</i>	<i>Friday</i>
8:10					
9:10		C. T. 32	C. T. 32		C. T. 32
10:10		Chapel	Chapel	Chapel	Chapel
11:00		A. C. 28	Assembly	A. C. 28	A. C. 28
12:00		III Preach- ing 29		III Preach- ing 29	
2:00	O. T. 12		O. T. 12		O. T. 12

Second Year—Spring Semester

<i>Hour</i>	<i>Monday</i>	<i>Tuesday</i>	<i>Wednesday</i>	<i>Thursday</i>	<i>Friday</i>
8:10					
9:10		C. T. 33	C. T. 33	V Preach- ing 30	C. T. 33
10:10		Chapel	Chapel	Chapel	Chapel
11:00		C. E. 27	Assembly	C. E. 27	C. E. 27
12:00					
2:00	N. T. 19	W. C. 24	N. T. 19	W. C. 24	N. T. 19

Third Year—Fall Semester

<i>Hour</i>	<i>Monday</i>	<i>Tuesday</i>	<i>Wednesday</i>	<i>Thursday</i>	<i>Friday</i>
8:10					
9:10					
10:10		Chapel	Chapel	Chapel	Chapel
11:00		IV C. Ed.	Assembly	IV C. Ed.	IV C. Ed.
		22		22	22
12:00		VI C. P.	VIII Pr.	VI C. P.	VI C. P.
		23	31†	23	23
2:00					

*For Duke Endowment Students, additional sections of Practicum are available.
Professional Courses I and II required of all students.

†Sections to be arranged.

Vocational Groups

In recognition of the existing and growing diversity of function within the 20th century Protestant Christian ministry, the program of studies leading to the B.D. degree has been designed to afford variability of emphasis within a basic unity. The core curriculum of basic theological studies provides uniform requirements for all. Variability of emphasis derives from the carefully tailored requirements peculiar to each vocational group. Election of a vocational group is election of a cluster of required courses regarded as providing adequate conversancy with a range of subject matter most pertinent to the special emphasis of the vocational group.

Each student shall choose his vocational group during the second semester of his first or junior year and give notice of his choice to the Office of the Dean of Students not later than May 1.

The student is urged to consult his faculty adviser in making his selection of a vocational group. Students electing Vocational Group I will be certified for that group by the Dean of Students. Students electing Vocational Group II shall have the approval of Professor Kale; those electing Vocational Group III, the approval of Professor Lacy; and those electing Vocational Group IV, the approval of Professor Goodling. Students electing Vocational Group V shall have the approval of the Dean and must offer an average of "B minus" for the academic record of their junior year. Students electing Vocational Group VI must have the approval of the Dean of Students. Choice of a vocational group is regularly subject to review of the Dean, and to the right to require alteration of election is reserved.

A qualifying final discipline is attached to each vocational group and constitutes a requirement for graduation. Open to students in their senior year, it carries two semester hours of credit. See page 27.

Electives in sufficient amount to complete 90 hours for graduation will be taken.

I. The Parish Ministry

A student electing Vocational Group I shall plan his program to include one course at a level higher than the core requirement from six of the following areas:

- | | |
|---------------------|---------------------|
| Biblical Studies | Pastoral Care |
| Care of the Parish | Church at Worship |
| Christian Education | Theological Studies |
| Historical Studies | |

This Vocational Group requires the following Professional Courses: III, IV, V, VI, VIII, and Philosophy of Christian World Mission.

II. The Ministry of Christian Education

A student should plan his courses so as to include three of the following Christian Education courses: 125, 126, 161, 162, and 169 and at least one course from among the following: 164, 165, and 166.

In addition the student is required to take P.C. 170 and the following Professional Courses: IV, VI, and Philosophy of Christian World Mission. Each student who selects this group will be guided in distributing the electives among the four major divisions of the curriculum.

Those students planning to pursue the Ministry of Christian Education within the Parish Ministry may also in certain circumstances be advised to take Professional Courses III and V.

This Vocational Group requires the following Professional Courses: IV, VI, VII, and Philosophy of Christian World Mission.

III. The Ministry of Missions

The student should plan his course so as to include the following courses in Missions and related subjects: W.C. 24, 133, and 156; H.R. 158; and C.E. 190. In addition he should take at least one of the following courses, depending on his field of anticipated service: H.R. 179, 180, and 182 or C.T. 213 (with appropriate substitutions if these are not offered).

Professional Courses III, IV, and V are required of this group.

IV. The Ministry of Pastoral Care

In addition to the required course in Pastoral Care, P.C. 26, the student should plan his program so as to include the following: P.C. 170; 171 or 172; 177; 174 or 188; C.T. 125 or T.S. 102; and H.T. 121 or one advanced course in Church History. Students must also take one advanced course in each of the following areas: Christian Theology; Christian Ethics or Christianity and Culture; and Biblical Studies.

Professional Courses III, V, and VI* are required of this group.

V. The Ministry of Teaching

A student electing Vocational Group V shall declare his major during the second semester of his first or junior year and shall select for concentration five of the areas listed below of which one shall be the designated major in which he shall take not less than nine semester hours. He shall in addition, ordinarily, take not less than five semester hours in each of the other four areas. Normally, the above requirements are met by courses of advanced level; however, introductory courses of the core curriculum, not already taken as standard requirements of the junior and

*C.Ed. 161 or 162 may be substituted for Professional Course VI.

middler years may be included as fulfilling the major and minor areas of study.

American Christianity	History of Religions and
Christian Education	World Christianity
Christian Ethics	New Testament
Christianity and Culture	Old Testament
Church History	Theology and Philosophy of Religion
Historical Theology	
Professional Courses III and V (or IV).	

VI. The Ministry to the Campus

Students electing this group are required to take at least one advanced course in Christianity and Culture, and one advanced course in Pastoral Care. They are also required to take C.Ed. 149. In addition, they are advised to select electives in consultation with the director of Vocational Group VI in such fashion to maintain balance between the several disciplines.

Students of this group are required to serve an apprenticeship which may be accomplished in either of two ways:

1. A student may work part-time for one academic year as commuting active staff member of a denominational college chaplaincy program currently operating on one of the campuses within a fifty-mile radius of Duke University. Specific assignments and terms of employment as permitted by the academic load of the students would, in such cases, be arrived at in consultation with the director of Vocational Group VI.

2. A student may apply to an appropriate foundation (or other comparable agency) for grant to work full time for a year as a Seminary intern in a college campus situation and, if he is awarded such a grant, fulfill in this way the apprenticeship requirement. Students of Group VI are encouraged to apply for such a grant before proceeding otherwise.

A student's association as intern or member of a chaplain's staff will be recorded on his transcript. Regular reports of the student's activity and performance are to be made by the student and by his immediate supervisor during the term of his work as intern or staff member.

Professional Courses III, IV, and V are required of this group.

Senior Vocational Qualifying Finals

Students of Groups I and V normally fulfill the above requirements during their fifth or sixth semester of residence. Students of Groups II and III normally receive assignments early in the fifth semester of resi-

dence and complete the assignment before graduation, although the date by which assignments must be completed may be set at the discretion of the student's committee. Students of Group IV normally take their seminar in the sixth semester of residence. The qualifying discipline for each group carries, when successfully completed, two semester hours of credit.

Each student must, as a requirement for graduation, complete the qualifying discipline of his chosen Vocational Group as described in the following paragraphs.

For Vocational Group I. On the basis of materials designated by instructors and developed according to methods and standards described in exemplary lectures given by a faculty panel, a student of this group is to write the following: (a) a complete, critical exegesis of an assigned Biblical text, (b) an analysis of a given theological theme related to the passage, showing both the Christian consensus and the student's assessment of it, and (c) a discussion of the problems involved in the homiletical presentation of the theme as uncovered by (a) and (b).

For Vocational Groups II and III. A student of either of these groups presents to a specified committee of the faculty an essay on an assigned subject. For credit the essay must, in the opinion of the committee, demonstrate the relation of the student's choice of particular field to his total program of study.

For Vocational Group IV. Each student electing this group must complete the seminar in the Theology of Pastoral Care, staffed by an interdisciplinary committee of the faculty, and present to the committee a paper on an assigned subject during the course of the seminar.

For Vocational Group V. A student electing this Group must satisfy the following Senior Vocational Qualifying Final requirements.

Not later than the beginning of his final semester the student shall select a subject for research in consultation with a designated professor in the area chosen by the student as his major.

During the semester he shall compile an annotated bibliography for the study of this subject, generally guided by the selection and evaluation of works, both primary and secondary, which he would normally use in planning a syllabus and bibliography for teaching a course with this subject as principal focus, and specifically informed by limits and criteria agreed upon by student and professor.

Not later than the second week before final examinations, the student should present three copies of this bibliography to the professor who shall, in agreement with the director of the qualifying final for the year (or his representative) and one other member of the faculty invited by the director, meet with the student for an oral discussion and examination of the bibliography. This examination should last not less than one hour and not longer than two.

The grade for the student should be determined by the professor of the student's major area, taking due account of the estimate of the bibliography offered by the other faculty members of the committee.

For Vocational Group VI. Students of this group are not required to take a qualifying final.

Administering the Curriculum

For the administration of the curriculum the following regulations have been adopted.

1. Full-time students must take the required courses as specified for the respective semesters.
2. The schedules of all students are subject to review and approval of the Dean and the Committee on Academic Standing.
3. Students in candidacy for the B.D. degree who accept student pastorates are advised that their program of study will require a fourth year. Students with pastoral charges will enroll for not less than eight nor more than twelve semester hours in any given semester.
4. Ordinarily, a student enrolled in candidacy for the B.D. or M.R.E shall enroll for no less than eight semester hours in any semester.
5. Not over 30 semester hours of Summer Session work may be credited toward the degree of Bachelor of Divinity.
6. The status of special student may not be granted simply to permit avoidance of the schedule of required courses. Every request for this classification will be carefully investigated and approval of the Dean is required.
7. A fee of \$15.00 is charged for auditing any course except where a student is already paying regular University fees. Permission to audit requires the approval of the Dean and the instructor concerned.
8. Student pastors and students working under The Duke Endowment Summer Field Work Program of the Rural Church are required to take one of the Field Work Practicums.

Language Study

A student who takes six hours of a New Testament language may be excused from either N.T. 18 or N.T. 19; one who takes six hours of an Old Testament language may be excused from either O.T. 11 or O.T. 12, depending on the year in which he takes Hebrew.

A part-time student who desires to begin the study of Greek in the first year may postpone the required course in Old or New Testament.

For a student planning to take both Greek and Hebrew, the Greek may be continued in the second year by postponing N.T. 19 in the fall semester and waiving O.T. 12 in the spring semester. (Reversed 1966-67.)

Suitable entry will be made on the permanent record of any student who is granted permission to deviate from the requirements in the matter of language.

Graduation Credits

It is the responsibility of each student to see that he meets all requirements for graduation, and to take his courses in proper sequence. He is also responsible for seeing that any special permission granted him to deviate from the normal program is properly recorded in his personal files. Deviations from a normal academic program must be approved by the Dean of Students as representative of the Dean of the Divinity School.

Grading System

The grading system of the Divinity School employs the letters A, B, C, D, and F, which have been defined as follows: A, Excellent; B, Superior; C, Average; D, Inferior; F, Failure; WP, Withdrew Passing; WF, Withdrew Failing; WI, Withdrew Illness and I, Incomplete; P, Passed. (See section on Incompletes.) No percentage equivalents are stated. A student is expected to maintain an average of "C."

In all courses where the instructor considers attendance a necessary part of the work of the course, a student may not receive a grade of over "C" if his absences total 12 per cent of the regular class periods, and if the absences total 24 per cent of the class periods he may not receive credit for the course.

Incompletes

A student may, with the permission of the instructor concerned, petition the Dean of Students to receive a grade of "incomplete" in a course. Such permission may be granted when a student, through some circumstance beyond his control, such as illness, has been hindered from meeting the course requirements. No "incomplete" is recorded without permission in writing from the Dean of Students. Ordinarily, an "incomplete" will not be approved in the case of students completing their academic work in the fall semester. An "Incomplete" automatically becomes an "F" unless it is removed through completion of assigned work by the following dates:

- for "Incompletes" incurred in fall semester courses, March 15, following;
- for "Incompletes" incurred in spring semester courses, October 15, following; and
- for "Incompletes" incurred in summer courses, October 15, following.

Change of Course or Withdrawal

A student is permitted to change his registration for course work without incurring a penalty no later than completion of the second meeting of the course from which he desires to withdraw or, correspondingly, of the course to which he seeks admission.

No student shall be permitted to drop a course after the expiration of one-third of the period of instruction of the course without incurring failure, except for causes adjudged by the Dean of Students to be beyond the student's control. Conditions of emergency and not considerations of convenience shall be regarded as determinative in considering requests.

Graduation with Distinction

Students who achieve a grade point average of 3.75 (A, 4; B, 3; C, 2; and D, 1) for over-all academic record in the Divinity School are granted the degree of Bachelor of Divinity, *summa cum laude*. Students with a grade point average of 3.5 are awarded the degree, *magna cum laude*. Such distinction is specified on their diplomas.

The Master of Religious Education Degree

The course of study leading to this degree is designed for persons desiring to engage in various forms of Christian Education.

Candidates for this degree must hold the degree of A.B. (or its equivalent), based upon four years of work beyond secondary education, in a college which is approved by one of the regional accrediting bodies, and with academic and personal records which afford promise of competence in this area of service. The course of study will be especially useful for individuals who have had one or more years of experience in Christian Education and desire further training. Candidates for this degree will be limited in number, and individuals interested are urged to apply for admission well in advance of the opening of the academic year. All work offered for this degree, whether in the regular year or in summer sessions, must be completed within a period of six years from the date of beginning.

It is desirable that an applicant for admission show a college average of not less than B-, but other factors are also important, and the Committee on Admissions takes special note of a rising curve of academic achievement and the supporting letters from college instructors and administrators as well as church officials.

Prerequisites

Three of the following five prerequisite studies must have been taken by the candidate prior to his admission to the Divinity School or must be

secured, without credit toward the M.R.E. degree, after being admitted:

General Psychology	3 s.h.	Education	3 s.h.	Religion	3 s.h.
Sociology	3 s.h.	Philosophy	3 s.h.		

General Requirements

Sixty semester hours of graduate-professional work are required for graduation. Not more than twelve semester hours of this work may be taken in approved summer sessions.

No credits are allowed for undergraduate courses. However, in approving plans of study leading to this degree, consideration will be given to earlier work taken in the fields of Biblical studies and Christian Education provided such courses were taken in the junior and senior years in accredited four-year colleges. Also, where candidates for the degree have been engaged professionally as Directors or Ministers of Christian Education for not less than twelve months prior to entering the Divinity School, a research project may be substituted for the required Christian Education Practicum, with the approval of the Director of the M.R.E. program and the Dean.

A student who secures credit for 15 semester hours each semester will be in line for graduation at the end of two academic years. The amount of work allowed in each semester may not exceed that permitted in the B.D. curriculum.

Candidates must also pass the English Bible examinations or equivalent described under requirements for the B.D. degree. Normally these examinations are taken in the second year of the M.R.E. program but, with permission of the director of the M.R.E. program, may be taken during the student's first year of residence.

Course Requirements for the M.R.E. Degree

Subject	Required Semester Hours
Biblical Studies (O.T. and N.T.)	9 to 12
Church History, Historical Theology and American Christianity	9 in two or more of these fields
Christian Theology	3 to 6
Philosophy of Religion or Christian Ethics	3
Worship	3
Pastoral Care	3
Christian Education	11
(including missionary education)	
Christian Education Practicum	3
Required Hours	44 to 50
Electives	10 to 16
Total hours, required and elective:	60

The Master of Theology Degree

The course of study leading to the degree of Master of Theology is designed for graduates of accredited theological schools who desire to continue or resume their theological education for enhancement of professional competence in selected areas of study. Enrollment in the Th.M. degree program is open to a limited number of students who have received the B.D. (or the equivalent) with superior academic records.

General Requirements

The general requirements for the degree of Master of Theology are:

1. thirty semester hours of advanced studies, with a minimum grade of "B" in each course;
2. superior performance in a comprehensive examination covering the major and minor areas of study; and
3. residence for one academic year.

There are no general language requirements, but classical or modern languages may be required for certain courses (for example, Hebrew or Greek in Biblical studies).

The Program of Study

At least twelve of the required thirty hours must be taken in one of the basic divisions of study (Biblical, Historical, Theological, or Professional) which shall be designated as the candidate's major, and at least six hours in another of the divisions which shall be designated as the candidate's minor. No more than twelve hours may be taken in the summer sessions. No more than six semester hours of work completed in another accredited institution may be transferred and credited toward the degree. Ordinarily, no more than six hours may be taken through directed reading, and no more than three in any one semester or summer term. In the area of Pastoral Care, up to fourteen hours may be taken through clinical training.

The major in Pastoral Care requires a calendar year. The candidate normally begins his training in June. This program provides two quarters of clinical credit through the Institute of Pastoral Care.

Each student will plan his program of courses and directed reading or clinical training with the guidance of a committee of two to be appointed by the director of the Master's Program. The committee will include a professor in the student's major area of interest, who will act as chairman, and a professor in the minor area. The chairman, in consultation with the director and the other member of the committee, will prepare, administer, and evaluate the comprehensive examination.

The comprehensive examination will be given at the close of the course of study for the degree, ordinarily in May or September.

The entire program of studies and comprehensive examination should be completed within twelve months. In exceptional cases, the time limit may be extended, but in no case beyond three years.

Please note under the chapter on "Student Expenses and Residential Arrangements" that the charges for tuition and general fee, combined, are made on the basis of the number of semester hours taken, and that in order to be eligible for medical and surgical care a student must be taking at least seven hours.

Student Expenses and Residential Arrangements

Fees and Expenses

Tuition and General Fees

There is an admission fee of \$30.00 which is applied to the first term bill. (See statement of requirements for admission for full details.)

<i>Items</i>	<i>Per Semester</i>
Tuition—B.D. and M.R.E.	\$262.50
General Fee—B.D. and M.R.E.	56.50
Approximate cost of meals	275.00
Room (double) for men	155.00
	\$749.00

The General Fee is in lieu of all special charges, and includes the following fees: matriculation, medical (provided student is taking at least 7 hours), library, damage, commencement, and diploma.

A student who is a candidate for either the B.D. or M.R.E. degree shall be liable for the tuition and general fee for the number of semesters required to complete the degree under a normal load of 15 hours. The B.D. candidate will pay tuition for six (6) semesters and the M.R.E.

candidate for four (4) semesters. If extra semesters are required to complete the degree, there will be no tuition for the extra semesters; however, the General Fee will be payable on a prorated basis.

Master of Theology Candidate. A student who is a candidate for the Th.M. degree shall be liable for tuition and general fee, combined, at the rate of \$20.00 per semester hour. All other costs and regulations for the Th.M. degree are the same as those for the B.D. and M.R.E. degrees.

Both the tuition and the general fee are due and payable not later than the day of registration for a particular semester.

Other Fees

Special Students. Those who are enrolled but who are not candidates for a degree. Tuition and general fee will be on a prorated basis and no scholarship aid is available.

Students matriculating in either semester at a date later than that prescribed in the catalogue shall pay to the Bursar of the University a penalty of \$5.00. After the day of registration no refund of the general fee or tuition will be made except for involuntary withdrawal to enter the Armed Services.

Athletic Fee. Divinity School students may secure admission to all regularly scheduled University athletic contests held on the University grounds during the entire academic year by payment of the athletic fee of \$15.00 per year, plus any Federal tax that may be imposed. This fee is payable in the fall semester.

Auditing Fees. Persons seeking to audit Divinity School courses must, with the consent of the instructor concerned, secure permission of the Dean's office. In accordance with general University practice a fee of \$15.00 per course will be required of all auditors who are not enrolled students.

Estimated Expenses

The total cost for a student to attend the Duke Divinity School varies according to individual tastes and requirements; however, experience indicates that a single student may expect to spend from \$1800 up, with the average approximately \$2050, and a married couple may expect to spend from \$3000 up.

The Board of Trustees of Duke University determines the costs of attending the Divinity School, and these are subject to change without notice.

Debts. Students who are reported by the Treasurer's Office as delinquent in their accounts will be debarred from credit in courses until cleared by the Treasurer's Office. Transcripts will not be issued for delinquent students.

Student Health

The payment of the general fee entitles the student who is taking a minimum of seven hours to full medical and surgical care, with the exceptions noted below. This service is under the direction of the University Physician with the cooperation of the staff of Duke Hospital. It includes hospitalization, medical and surgical care, drugs, dressings, X-ray studies, and ward nursing. A charge for board is made at the same rate as in the University dining halls. Refraction of eyes, treatment of teeth, and of all chronic conditions, such as the removal of diseased tonsils, are not included in this service. The cost of any necessary braces and orthopedic appliances, as well as of special nursing, must be borne by the student.

Since the Student Health Program does not cover students while away from the Duke Campus, it is imperative that student pastors and assistant pastors (winter and/or summer) who are subjected to the hazards of highway travel with great frequency, secure complementary health and accident insurance for the full twelve month period.

Information concerning such a policy may be secured by inquiring at the office of the Dean of Students. Such a complementary policy is recommended for all students.

Married students are required to carry insurance coverage for their dependents, providing for hospital, medical, and surgical care.

Living Accommodations

Housing

The Men's Graduate Center is available to men enrolled in the Divinity School. The rooms are equipped for two persons and the rental charge for a double room is \$155.00 each semester per occupant. The rental charge for a single room is higher.

A graduate section in Hanes Annex near the Men's Graduate Center is available for women students in the Divinity School who desire to reside in University residence halls. The rental charge is \$167.50 per semester for each occupant. Sixty-six spaces are available in twenty-two family type air conditioned apartments, featuring one large bedroom, one smaller bedroom, one and one-half baths, a kitchen-dining room, and a living room. The rental rate for each occupant is \$225.00 per semester. Details of housing for graduate women will be provided on request to the Director of Housing, Duke University, Duke Station, Durham, North Carolina.

Duke University Apartments, which consist of efficiency, one- and two-

bedroom apartments, are available to married graduate students. The apartments are complete with basic furnishings and the current rental charges per month are \$70.00 for the efficiency, \$90.00 for the one-bedroom, and \$110.00 for the two-bedroom. Heat, electricity, except for window fans and air conditioners, hot and cold water, garbage and trash collection, and maintenance of grounds are all included in the rental charge. For further information on married student apartments, write to the Director of Housing, Duke Station, Durham, North Carolina.

Residence hall rooms, graduate women's apartments, and Duke University Apartments may be reserved by new applicants only if they have been accepted officially for admission to the Divinity School. Applications for residence hall rooms are to be made to the Director of Housing, Duke Station, Durham, North Carolina. A \$25.00 room deposit is required of each applicant before a residence hall room or women's apartment reservation is made. The initial room deposit is effective during the student's residence in the University residence halls or graduate women's apartment if attendance is continuous in regular academic years. The deposit will be refunded under the following conditions:

1. Within thirty days after the student has been graduated provided written notice is received at the Housing Bureau requesting refund.
2. Upon withdrawal from Duke University Residence Halls by students enrolled on the semester basis, provided written notice is received in the Housing Bureau by August 1st for cancellation of a reservation for the fall semester, and not later than January 15th for cancellation of a reservation for the spring semester.
3. When the reasons requiring withdrawal are beyond the student's control.

No refund will be made until the occupant has checked out of his room through the Housing Bureau and has settled his account with the Bursar.

A resident student, in order to retain his room for the succeeding academic year, must make application at the office of the Director of Housing for confirmation of the reservation.

The authorities of the University do not assume responsibility for persons selected as roommates. Each student is urged to select his roommate when the room is reserved. Any student who occupies a double room without a roommate will be given written notice from the Housing Bureau to obtain a roommate or he may be required to pay the rental consideration for the whole room. Apartment regulations are similar.

Any exchange of rooms must be made at the Housing Bureau. Persons exchanging rooms without the approval of the Housing Bureau will be subject to the charges for both rooms.

Rooms and apartments for graduate women are rented for the academic year but for no period of less than one semester without special arrange-

ments. After the day of registration, no refund of room rent will be made except for involuntary withdrawal to enter the Armed Services. Such refunds will be made in accordance with the University's established schedule. Regulations governing the occupancy of rooms will be supplied by the Housing Bureau to those students who make application for housing. Occupants are expected to abide by these regulations.

Dining Halls

Food service on both the Woman's College Campus and the West Campus is cafeteria style. The cost of meals approximates \$250.00-\$300.00 per semester depending upon the need and taste of the individual. The dining facilities on the West Campus include three cafeterias with multiple choice menus and, in addition, the Oak Room, where full meals and *a la carte* items are served. The Men's Graduate Center has a cafeteria open at meal hours and a coffee lounge which is open until 11:00 p.m. The prices are the same as in the West Campus Union.

Motor Vehicles

Each student possessing or maintaining a motor vehicle at Duke University shall register it annually at the Traffic Office in Building 10. It must be registered within five (5) calendar days after operation of vehicle on campus begins. Students resident in dormitories are required to pay an annual parking fee of \$30.00 for each motor vehicle, excepting that a parking fee of \$10.00 is required for each motorcycle, motorbike, or motor scooter. The proper registration emblem must be displayed at all times.

At the time of registration of a motor vehicle, the following documents must be presented:

1. State vehicle registration certificate.
2. Valid driver's license.
3. Satisfactory evidence of automobile liability insurance coverage within limits of at least \$5,000.00 per person and \$10,000.00 per accident for personal injuries, and \$5,000.00 for property damage, as required by North Carolina Motor Vehicle Law.
4. If student is under 21, a statement signed by the student's parent or guardian granting the student permission to operate a motor vehicle at Duke University.

Students are expected to abide by the Parking, Traffic and Safety Regulations, a copy of which will be given the student at time of registration.

Statement of Financial Aid

A student should select his school on the basis of educational opportunity. At the same time financial considerations will be of legitimate and often of pressing concern. Each student should formulate at least a tentative plan for financing his seminary education. Such a plan would not of necessity demand absolute assurance of all necessary educational expense, but should include specific resources for the first year and a knowledge of probable resources for the second and third years.

Tuition grants and other financial aids are available in order that no student may experience such financial difficulty as would prevent his obtaining a Divinity School education.

The Committee on Scholarships and Financial Aid will gladly counsel the student concerning financial needs and resources. Financial assistance may consist of scholarships, loans, tuition grants, grants-in-aid, and employment which may be worked out in various combinations on a year-to-year basis, with reapplication and review each year.

Financial Resources

Personal

These may be savings and earnings, gifts from family and friends, and, if married, earnings of spouse and gifts from parents of spouse. In calculating anticipated income, the student first considers his own resources.

Church

Many local churches and conferences or other governing bodies provide gifts and grants for theological education, from Ministerial Training Funds which provide grants and/or loans to theological students. The student makes application to his own church, Annual Conference, Presbytery, or other governing body.

The Divinity School

Scholarships

Junior Merit Scholarships. These are ordinarily granted upon nomination by undergraduate school.

National Methodist Scholarships. The General Board of Education of The Methodist Church makes available two \$500 scholarships to outstanding students in the first year class.

Middler Academic Scholarships. Two scholarships of \$500 each are made available on the basis of academic excellence and leadership potential.

Senior Honor Scholarships. Each year a limited number of honor scholarships are awarded to rising seniors who have achieved academic excellence and who give unusual promise of service in the pastoral ministry.

Foreign Student Scholarships. In cooperation with the Crusade Scholarship Committee of The Methodist Church and other authorized church agencies students are selected and are admitted to courses of study. Scholarships for such students are provided from the Lewis Clarence Kerner Scholarship Fund and from individual Churches and private philanthropy.

Tuition Grants

These, in varying amounts commensurate with need, are available upon application to the Committee on Scholarship and Financial Aid. Currently enrolled students who are eligible for consideration must apply in February prior to the academic year for which a tuition grant is requested. Entering students may apply when admitted.

Grants-in-Aid

Varying amounts are made available through the Divinity School to students who choose to make participation in the Endowment and Field Education Program an integral part of their seminary training. The Grant-in-Aid Program includes the following:

1. Summer Assistant Pastors.
2. Winter Assistant Pastors.
3. Student Pastors. See full description under section on Field Education.

Loans

Loan funds held in trust by the University, as well as Methodist Student Loans and funds supplied by the Federal Government, through the National Defense Education Act of 1958, are available to qualified students. Submit application by July 1.

Note: Unless otherwise indicated all correspondence concerning financial aid should be directed to: Financial Aid Office, The Divinity School, Box 4814, Duke Station, Durham, N.C.

Employment

Students or wives desiring employment with the University should apply to the Director of Personnel, 01 Allen Building, Duke University, Durham, North Carolina. Students or wives make their own arrangements for employment either in the City of Durham or on campus.

Financial Aid Resources

Certain special funds have been established, the income from which is used to provide financial aid through scholarships and grants-in-aid for students wishing to secure training in preparation for Christian ministry. The resources listed below include endowed funds and sources of annual contributions.

R. Ernest Atkinson Legacy

This legacy was established in 1952 under the will of the Reverend R. Ernest Atkinson of Richmond, Virginia, who was a member of the Trinity College Class of 1917.

Mary Reynolds Babcock Foundation Scholarships

Through the Mary Reynolds Babcock Foundation of Winston-Salem, North Carolina, a limited number of scholarships in an amount not exceeding \$1,400 per year are granted to students in candidacy for the B.D. degree, on nomination and decision of the Dean and Committee on Scholarships and Financial Aid.

E. M. Cole Fund

This fund was established in 1920 by Mr. Eugene M. Cole, a Methodist layman of Charlotte, North Carolina.

The Duke Endowment

Among the beneficiaries of The Duke Endowment, established in 1924, are the rural Methodist churches of the two North Carolina Conferences. Under the Maintenance and Operation Program grants-in-aid are available for Duke Divinity School students to participate as assistant pastors in rural Methodist churches under the Endowment and Field Education Program.

N. Edward Edgerton Fund

This fund was established in 1939 by Mr. N. Edward Edgerton of Raleigh, North Carolina, an alumnus of Duke University of the Class of 1921.

Thomas Jefferson Finch Scholarship

In 1955 Mr. George David Finch, '24, and Mr. Brown Faucette Finch, '54, established an annual scholarship in the amount of \$650 a year in memory of Mr. Thomas Jefferson Finch, Trinity College Class of 1884, who was the father and grandfather of the donors.

The James A. Gray Fund

In 1947 Mr. James A. Gray of Winston-Salem, North Carolina, presented the fund, which bears his name, to the Divinity School for use in expanding and maintaining its educational services in behalf of North Carolina churches and pastors.

P. Huber Hanes Scholarship

Mr. P. Huber Hanes of Winston-Salem, North Carolina, an alumnus of Duke University of the Class of 1900, has established for Duke University an annual scholarship fund, a portion of which is used to provide financial assistance for Divinity School students.

George M. Ivey Scholarship Fund

This fund was established in 1948 by gift of George M. Ivey, of Charlotte, North Carolina, an alumnus of Duke University of the Class of 1920.

Lewis Clarence Kerner Scholarship

This scholarship was established in 1959 by Beatrice Kerner Reavis, of Henderson, North Carolina, in memory of her brother, Lewis Clarence Kerner, and designated for the assistance of native or foreign-born students preparing for service in world Christian missions.

Laurinburg Christian Education Fund

This fund was established December 11, 1948, by gift through the Methodist College Advance Fund.

Myers Park Scholarship Fund

This fund was established in 1948 by members of the Myers Park Methodist Church, Charlotte, North Carolina.

W. R. Odell Scholarship

This fund was established in 1946 by the Forest Hills Methodist Church, Concord, North Carolina.

Jesse M. Ormond Scholarship Fund

In 1948 the North Carolina Conference established a fund in honor of Professor Jesse M. Ormond, who for many years was Director of Field Work and Professor of Practical Theology.

Gilbert T. Rowe Memorial Scholarship Fund

This scholarship fund was established in 1962-4 through the generosity of Divinity School Alumni and friends of the late Gilbert T. Rowe, Professor of Symbolic Theology.

Elbert Russell Scholarship

This scholarship was established in 1942 by the Alumni Association of the Divinity School in honor of Elbert Russell, who served as Dean of the Divinity School and Professor of Biblical Theology.

Hersey E. Spence Scholarship

This scholarship was established in 1947 by the Steele Street Methodist Church of Sanford, North Carolina, in honor of Professor Hersey E. Spence, a former pastor of the congregation.

The Methodist Church

The Methodist Church makes a substantial contribution to the Divinity School by designating a certain percentage of its World Service offerings to the Divinity School.

The North Carolina and the Western North Carolina Conferences direct a certain percentage of their College Sustaining Funds to the Divinity School. The South Carolina Conference is a contributor to the Divinity School operational income.

The General Board of Education makes available annually two National Methodist Scholarships having a cash value of \$500 each. (See page 42.)

Local Methodist churches and individuals make contributions to the financial aid program of the Divinity School, thus making it possible to assign students under the Endowment and Field Education Program to urban and out of state churches.

Dempster Graduate Fellowships

The Methodist Board of Education offers each year the Dempster Graduate Fellowships for graduates of Methodist Theological Schools, who are engaged in programs of study leading to the degree of Doctor of Philosophy in Religion with a view to teaching in Methodist colleges and seminaries. Several Divinity School graduates have held these fellowships.

Foreign Scholarship Fund

Maintained through annual contributions of individuals and churches. Contributions for 1965-66 included: St. Paul's Methodist Church, Goldsboro, North Carolina, Hayes Barton Methodist, Raleigh, North Carolina.

Field Education

Its Nature and Purpose. Field Education is conceived to have a two-fold nature. (1) It is a vital part of the total education of the theological student, testing his motivation and fitness for the vocation of the ministry. (2) It is a symbol of a mutual relationship between the seminary and the local church, and it is an effective way of declaring and implementing the purpose of the seminary to serve the church as well as the student.

More specifically it is the purpose of Field Education to: (1) assist the student in understanding the nature and task of the local church; (2) study some of the practical problems involved in the care of the parish; (3) afford an opportunity for the progressive development of the student's knowledge and ministerial skills through responsible participation in the life of the church; (4) contribute leadership to the churches of the region; and (5) provide, in most instances, grants-in-aid to assist the student in defraying educational expenses.

Opportunities for participation in the Field Education program are made available through the cooperative efforts of The Divinity School, churches, pastors, and district superintendents, or equivalent officials of other denominations. The student must make application for the particular program in which he wishes to participate.

Types of Field Education. (1) Summer Assistant Pastors: Upon request of a church, a student is assigned by the Committee on Endowment and Field Education to serve ten weeks as an assistant. The student is provided board, room, laundry, necessary travel, and a grant-in-aid

of \$800.00. To participate the student must secure credit in Practicum II and participate in the preparatory training sessions under The Duke Endowment Student Association. A majority of the students are assigned to Methodist rural charges in the state of North Carolina. Married students whose wives work must be prepared to go without their wives. A limited number of entering students can be assigned; however, prior consideration is given to rising Middler and Senior students. Students transferring to another seminary are not eligible for assignment the summer prior to transfer. (2) Winter Assistant Pastors: In consultation with the pastor, church leaders, district superintendents and/or other responsible leaders, students are assigned to serve as assistants during the academic year. The time element will vary from six to 15 hours per week and the grant-in-aid will vary accordingly up to \$800.00. If more than 15 hours of service per week is required the student will be required to reduce his academic load. (3) Student Pastors: A student may be appointed by an annual conference or other official agency of a recognized denomination to serve as a student pastor. However, the student must have the approval of the Director of Field Education, as agent of the Dean, before accepting an appointment as a student pastor. All student pastors must secure credit for Practicum I; enroll for not less than eight nor more than twelve hours per semester, thus requiring four academic years to complete the B.D. degree; and, if the charge being served is located beyond 50 to 55 miles from the campus, the students are required to live in Durham or vicinity during the academic week, Monday 2:00 p.m. through Friday 4:00 p.m. Salaries and other forms of support are arranged by church officials in keeping with denominational policies and are reported to The Divinity School. (4) Other Church Related Positions: These consist of teaching church school classes and counseling youth groups, and are expected to require no more than three to six hours per week. These positions may or may not involve grant-in-aid.

Supervision. Through the coordinated efforts of the Divinity School, the local churches, District Superintendents, and pastors there is continuous supervision of all students participating in the Endowment and Field Education Program. Under the general direction of the Director of Field Education, members of the administrative and teaching staff share in administering this program.

Supervision is carried on through: (1) Practicum I, required in the first semester of service as a student pastor, and Practicum II, required of all students planning to participate in the Summer Endowment and Field Education Program; (2) Regular visits by supervisors to charges served by student pastors and assistant pastors, followed by student-supervisor conferences; (3) Seminars (one day) for supervisors; (4) Regular reports from all students and charges to the Endowment and Field Education Office.

Courses of Instruction^{*}

Required courses are numbered from 10 to 70. Elective courses carrying credit in the Divinity School only are numbered from 71 to 199. Courses approved for credit in both the Divinity School and the Graduate School of Arts and Sciences are numbered above 200. Lists of courses to be offered in any semester will be available at the time of each registration.

I. Biblical Studies

Old Testament

Old Testament English Bible I. (Meets two hours weekly.) 1 s.h.
Mr. Efrd

11. *Introduction to the Old Testament I.* The origin, literary forms, and contents of the books of the Old Testament in their geographical and historical setting on the Exile. 3 s.h. Mr. Tucker

12. *Introduction to the Old Testament II.* Introduction to and interpretation of Exilic and post-Exilic prophecy, Psalms, wisdom literature, the Chronicler, apocalyptic, and the Apocrypha. 3 s.h. Mr. Goodman

*On approval of the Dean, courses offered in the Graduate School of Arts and Sciences other than those approved for credit in the Divinity School may be approved for credit in individual cases, provided no equivalent course is offered in the Divinity School; each case to be decided on its merits.

101. *Post-Exilic Prophecy.* A study of the post-Exilic prophets from Ezekiel to Daniel, with special reference to Messianic prophecy and related theological problems. 2 s.h.

106. *Exegesis of the English Old Testament.* A. A book of the Pentateuch; B. A prophetic book; C. A historical book; D. Selected poetical materials. (O.T. 106 A, O.T. 106 B, O.T. 106 C, and O.T. 106 D are separate courses, offered in different semesters.) Prerequisite: O.T. 11 or the equivalent. 2 s.h. *Staff*

196. *The Bible and Recent Discoveries.* A survey of the contribution of the cultural setting of the Bible as an aid to its understanding. 3 s.h.

201-202. *First Hebrew.* The principles and structure of the Hebrew language with translation of selected Old Testament narratives. One year of Greek prerequisite. 6 s.h. *Mr. Stinespring*

207. *Second Hebrew.* Historical Hebrew grammar with reading and exegesis of Old Testament prose (Pentateuch and historical books in alternate years). First semester. 3 s.h. *Staff*

208. *Second Hebrew.* Historical Hebrew grammar with reading and exegesis of Old Testament poetry (Prophets and the Writings in alternate years). Second semester. 3 s.h. *Staff*

209. *Old Testament Theology.* Studies of the Old Testament in regard to theological themes and content. Prerequisite O.T. 11-12 or equivalent. 3 s.h. *Mr. Tucker*

301. *The Theology of the Dead Sea Scrolls.* A study of the religious ideas of the Scrolls in relation to the theology of the Old and New Testaments. Prerequisite: O.T. 11. 3 s.h.

302. *Studies in the Intertestamental Literature.* Selected documents of the Apocrypha and Pseudepigrapha examined exegetically and theologically in their relation to post-Exilic Judaism. Prerequisite: Permission of the instructor. 3 s.h.

304. *Aramaic.* A study of the Aramaic portions of the Old Testament, and selected passages from the Targums, Midrashes, and Talmuds. 3 s.h. *Mr. Stinespring*

305. *Third Hebrew.* An interpretative study of late Hebrew prose, with readings from Chronicles, Ecclesiastes, and the Mishnah. 3 s.h. *Mr. Stinespring*

306. *Language and Literature of the Dead Sea Scrolls.* A study in interpretation. Prerequisite: a knowledge of Hebrew. 3 s.h.

307. *Syriac.* A study of the script and grammar, with readings from the Syriac New Testament and other early Christian documents. Some knowledge of Hebrew and Aramaic prerequisite. 3 s.h. *Mr. Stinespring*

309. *History of the Ancient Near East.* A specialized study of the civilizations of Egypt, Palestine, Syria, and Mesopotamia in the light of Biblical archaeology. 3 s.h. *Mr. Tucker*

310. *Old Testament Prophecy.* The prophetic movement in Israel with

special emphasis on the theological standpoint of the prophets of the eighth century B.C. Prerequisites: O.T. 11 and O.T. 12. 3 s.h. *Mr. Stinespring or Mr. Tucker*

**History of Art 215. Religious Art of the Ancient Near East.* The development of art, particularly architecture and sculpture, as the material expression of religious ideas in Egypt, Mesopotamia, and in part Syria and Palestine to the Persian conquest. 3 s.h. *Mr. Markman*

**History of Art 216. Religious Art of the Classical World.* The religious art, particularly architecture and sculpture, of Greece and Rome with special emphasis on the monuments in the Near East. 3 s.h. *Mr. Markman*

New Testament

New Testament English Bible II. (Meets two hours weekly.) 1 s.h. *Mr. Efrid*

18. *Early Christian Life and Literature.* A basic study of the civilization in which Christianity began; the origin and development of the Christian Church and its literature through the second century. 3 s.h. *Mr. Efrid*

19. *Introduction to New Testament Theology.* A constructive analysis and exposition of the positive doctrinal content of the New Testament. Prerequisite: N.T. 18. 3 s.h. *Mr. M. Smith*

103-104. *Hellenistic Greek.* Designed for beginners to enable them to read the Greek New Testament. 6 s.h. (Two sections) *Staff*

105. *Studies in Paul.* An investigation of Paul's apostolate based upon the Acts and the Epistles with attention to Paul's theology as reflected in selected passages. 3 s.h. *Mr. Efrid*

107. *The Church in the New Testament.* An exegetical consideration of the important New Testament texts relevant to the development of church order, ministry, sacraments, and/or other important dimensions of the primitive community and its self-consciousness. Prerequisite: N.T. 18. or equivalent. 3 s.h. *Mr. M. Smith*

116. *Exegesis of the English New Testament I.* A. Luke-Acts; B. Galatians and I Corinthians; C. The Pastoral Epistles. (N.T. 116 A, N.T. 116 B, and N.T. 116 C are separate courses, offered in different semesters.) 2 s.h. *Staff*

117. *Exegesis of the English New Testament II.* A. The Gospel and Epistles of John; B. Romans. (N.T. 117 A and N.T. 117 B are separate courses, offered in different semesters.) 2 s.h. *Staff*

118. *The New Testament in Greek.* Readings in the Gospels. 3 s.h. *Staff*

119. *The New Testament in Greek.* Readings in the Epistles. 3 s.h. *Staff*

*Course offered in the Graduate School of Arts and Sciences which is credited toward the degree of Bachelor of Divinity.

225. *Living Issues in New Testament Theology.* Examination of recent major questions of debate in the New Testament field. Prerequisite: N.T. 19. 3 s.h.

226. *Exegesis of the Greek New Testament I.* A. Mark and Matthew; B. Romans; C. Colossians and Ephesians. (N.T. 226 A, N.T. 226 B, and N.T. 226 C are separate courses, offered in different semesters.) Prerequisite: N.T. 103-104. 3 s.h. Mr. M. Smith

227. *Exegesis of the Greek New Testament II.* A. Luke-Acts; B. Galatians and I Corinthians; C. The Pastoral Epistles; D. The Apocalypse. (N.T. 227 A, N.T. 227 B, N.T. 227 C, N.T. 227 D are separate courses, offered in different semesters.) Prerequisite: N.T. 103-104. 3 s.h. Mr. M. Smith

318. *Textual Criticism of the New Testament.* A study of the scientific recovery of the Greek text on which modern versions are based; manuscript discoveries; principles of textual criticism; practice in collating original manuscripts in the Duke collection. Prerequisite: N.T. 103-104, or the equivalent. 3 s.h. Mr. Clark

340-341. *Seminar in the New Testament.* Research and discussion on a selected problem in the Biblical field. 3 s.h. Mr. M. Smith

See also Pr. 185 and O.T. 209.

***Greek 257.** The social and cultural history of the Hellenistic world from Alexander to Augustus. 3 s.h. Mr. Rogers

***Latin 258.** The social and cultural history of the Graeco-Roman world. 3 s.h. Mr. Rogers

II. Historical Studies

Church History

13. *History of the Church to the Protestant Reformation.* A survey through the fifteenth century in terms of spiritual genius, organizational development, great literature, and representative movements. 3 s.h. Mr. Petry

14. *History of Modern European Christianity.* A survey of the main currents in Reformation and post-Reformation church history. 3 s.h. Mr. Hillerbrand

85. *Seminar in Modern European Christianity.* A seminar devoted to the study of select aspects of Reformation and Post-Reformation Church History. This year the seminar will consider Reformation and Post-Reformation Confessions of faith. Prerequisite: C.H. 13-14. 2 s.h. Mr. Hillerbrand

*Course offered in the Graduate School of Arts and Sciences which is credited toward the degree of Bachelor of Divinity.

137. *Religious Leaders in Christian History.* Representative leaders in the early and medieval church studies in relation to contemporary churchmanship. Prerequisite: C.H. 13. 3 s.h. *Mr. Petry*

138. *Great Books in Christian History.* An intensive study of Augustine's *Confessions*, Thomas à Kempis' *Imitation of Christ*, Erasmus's *Complaint of Peace*, Luther's *Christian Liberty*, Calvin's *Instruction in Faith*, and Andrewes' *Private Devotions*. 3 s.h. *Mr. Petry*

139. *Methodism.* A study of Methodist societies in England and the developing church in America as they gave rise to such historic issues as polity, education, division, and reunion. Prerequisite: C.H. 13. 2 s.h. *Mr. Petry*

140. *The Rise of Methodism and the Anglican Background.* The Methodist societies within the Church of England to the death of Wesley. Prerequisite: C.H. 13-14. 3 s.h. *Mr. Baker or Mr. Rogers*

(Students are advised that either C.H. 139 or C.H. 140 will satisfy the Methodist Discipline Requirement No. 344.)

142. *British Methodism after Wesley.* British Methodism in its nineteenth and twentieth century development. Prerequisite: C.H. 14. 3 s.h. *Mr. Baker*

250. *The Reformation of the 16th Century.* An advanced study of the time between 1517 and 1555 with particular reference to the left wing movements of reform. 3 s.h. *Mr. Hillerbrand*

251. *The Age of Counter-Reformation.* An advanced study of the time between 1555 and 1650. 3 s.h. *Mr. Hillerbrand*

252. *Pietism, Deism, Rationalism.* An advanced study of the currents of European Christianity between 1650 and 1800. 3 s.h. *Mr. Hillerbrand*

253. *History of Modern Catholicism.* A survey of the main currents of Post-Tridentine Catholicism. 3 s.h. *Mr. Hillerbrand*

330. *The Church in Europe Since 1800.* Emphasis is placed on the relation of the church to the social, economic, and political life of Modern Europe. Particular attention is given to Papal pronouncements on social issues, the relationship of Eastern to Western institutions, and ecclesiastical historiography as it involves source editions, periodicals, and ecumenical literature. 3 s.h. *Mr. Petry*

331. *The Social Message of the Early and Medieval Church.* A study of the social teachings and contribution of the Christian church prior to the Protestant Reformation. Prerequisite: C.H. 13. 3 s.h. *Mr. Petry*

332. *The Medieval Church.* Outstanding characteristics of the medieval church, emphasizing theory, polity, institutions, sacraments, and worship. Prerequisite: C.H. 13. 3 s.h. *Mr. Petry*

334. *Church Reformers and Christian Unity.* The work of such reformers as Marsilius of Padua, William of Ockham, Jean Gerson, Pierre d'Ailly and Nicholas of Cusa in relation to ecclesiastical schism and the

search for Christian unity through representative councils. Prerequisite: C.H. 13. 3 s.h. *Mr. Petry*

336. *Christian Mysticism in the Middle Ages*. Source studies, in historical perspective, of such late medieval mystics as Bernard of Clairvaux, the Victorines, Ramon Lull, Meister Eckhart, Richard Rolle, Catherine of Siena, and Nicholas of Cusa. Prerequisite: C.H. 13. 3 s.h. *Mr. Petry*

Historical Theology

21. *The Theology of the Protestant Reformation*. The Reformation of the 16th century and its outcome in the 17th and 18th centuries. 3 s.h. *Mr. Grislis*

111. *Literature of the Latin Church*. Readings, in the Latin originals, of diverse kinds of writing produced by the Latin Church in various periods of its history. Prerequisite: Permission of instructor. 3 s.h.

120. *Faith and Heresy in Dialogue*. Studies in the origin and role of the Apostles', the Nicene, and the Chalcedonian Creeds in their contemporary setting. 3 s.h. *Mr. Grislis*

121. *Sacraments in the Christian Church*. Ecumenical studies in devotion and division: Baptism and the Lord's Supper. 3 s.h. *Mr. Grislis*

123. *The Theology of the Early Church*. An introduction to the history of doctrine from the 2nd to the 6th centuries. 3 s.h. *Mr. Grislis*

234. *The Theology of Thomas Aquinas*. A systematic interpretation of the thought of Aquinas, with a major emphasis on his specifically theological formulations, drawing upon the *Summa Theologica* and other relevant sources. 3 s.h. *Mr. Grislis*

240. *The Theology of Richard Hooker*. An exposition of the writings of the Systematic Theologian of Anglicanism in the sixteenth century. 3 s.h. *Mr. Grislis*

260. *Seminar: Life and Thought of the Wesleys*. A seminar on John and Charles Wesley and their colleagues in relation to English culture and religion in the eighteenth century. Permission of instructor. 3 s.h. *Mr. Baker*

261. *The Theology of John Wesley*. A study of the development and structure of Wesley's theology, with special reference to his doctrines of man and salvation. Prerequisite: Permission of instructor. 2 s.h. *Mr. Richey*

337. *The Theology of Martin Luther*. A critical and comparative examination of Luther's thought. 2 s.h. *Mr. Hillerbrand*

338. *The Theology of John Calvin*. An exposition of the *Institutes of the Christian Religion* in relation to cognate documents. Prerequisite: H.T. 21. 3 s.h. *Mr. Grislis*

American Christianity

28. History of American Christianity. A consideration of the nature of Christianity in America and the history of its development. 3 s.h. Mr. Henry

129. The Theology of American Methodism. A study of Methodist dogmatics from 1784 through 1903, including doctrinal standards and representative systems from Richard Watson through Henry C. Sheldon. 3 s.h. Mr. Rogers

199. The American Social Gospel. A study of Protestant social thought and action in America since 1865. 3 s.h. Mr. Henry

296. Religion on the American Frontier. A study of the spread of evangelical Christianity as a theological and cultural phenomenon of the American West. Prerequisite: A.C. 28. 3 s.h. Mr. Henry

372. Theology of Paul Tillich. An examination of Tillich's philosophical theology. 2 s.h. Mr. Robinson

385. Religion in American Literature. A critical study of the meaning and value of religious motifs reflected in American literature. 3 s.h. Mr. Henry

395. Christian Thought in Colonial America. Exposition of the main currents in Protestant Theology. 3 s.h. Mr. Henry

396. Liberal Traditions in American Theology. A study of the main types of modern religious thought, beginning with the theology of the Enlightenment. 3 s.h. Mr. Henry

397. Contemporary American Theology. A critical appraisal of major tendencies. 3 s.h. Mr. Henry

World Christianity

24. Philosophy of the Christian World Mission. A study of theological foundations, guiding principles, and contemporary problems of the World Christian Community. 2 s.h. Mr. Lacy

133. History of Christian Missions. A survey of the spread of Christianity with special emphasis on 19th and 20th century Protestantism. 2 s.h. Mr. Lacy

135. Area Studies of the Christian Church. The cultural setting and current programs and policies of the Church in one of the following areas: a. Latin America, b. India and Pakistan, c. Africa, d. Southeast Asia, e. Japan-Korea-Philippines, f. Moslem Lands, or g. United States Home Missions. (The area of study to be determined by student interest in consultation with the instructor.) 2 s.h. Mr. Lacy and Others

156. The Ecumenical Movement. Its contemporary development, structures, activities—and problems, against the background of Church unity and disunity. 3 s.h. Mr. Lacy

386. Seminar: Theological Trends in the World Church. Contemporary

currents of Christian thought as they affect the resurgent non-Christian faiths, new formulations of a theology of mission, and ecumenical conversations. 3 s.h. *Mr. Lacy*

See also: C.Ed. 126, C.E. 190, C.E. 292, and C.E. 333.

History of Religions

158. *Contemporary Non-Christian Religions.* Critical consideration of contemporary conditions in major non-Christian traditions, with special reference to Hinduism, Buddhism, Islam, and African Religions. 3 s.h. *Mr. Sullivan*

180. *Religions of the Near East.* Historical and theological introduction to the major indigenous traditions of the Near East, especially Zoroastrianism, and Islam. 3 s.h. *Mr. Partin*

182. *Religions of India.* Historical and theological introduction to Indian religious life and thought. The development of Buddhism is covered, as well as Jainism and Sikhism, along with the various modes of Hinduism. 3 s.h. *Mr. Sullivan*

280. *The History of Religions.* A study of the methodology of the History of Religions, the nature of religious experience and specific categories of religious phenomena. Permission of instructor. 3 s.h. *Mr. Sullivan*

III. Theological Studies

Philosophy of Religion

20. *Types of Religious Philosophy.* Basic historical orientation in religious thought, especially in Western Culture. 3 s.h. *Mr. Robinson*

102. *Christian Apologetics and Modern World Views.* A constructive approach to the Hebrew-Christian understanding of Creator and creature in the light of contemporary scientific knowledge. 3 s.h. *Mr. Robinson*

Christian Theology

32. *Introduction to Christian Theology I.* The major themes of the theology of the church: nature and task of theology, knowledge of God, man and Christ. 3 s.h. *Mr. Cushman*

33. *Introduction to Christian Theology II.* God the redeemer, the church, word and sacrament, authority and ministry, the Kingdom of God. 3 s.h. *Mr. Herzog*

108. *Revelation and Authority.* A study of the relationship between revelation, Bible, preaching and the church. 3 s.h. *Mr. Herzog*

110. *This Life and the Age to Come*. Christian eschatology and the meaning of history in the light of God's triumph over sin, suffering, and death. 3 s.h. Mr. Robinson

*125. *Theological and Psychological Interpretations of Man*. An inquiry into the relations of theological and psychological views of man's nature, predicament, and deliverance. 3 s.h. Mr. Richey

195. *Origins of Dogmatic Thought*. An analysis of dogmatic concepts in the Gospel of John: their development into a body of doctrine. 3 s.h. Mr. Herzog

200. *The Person and Work of Christ*. The problem of knowledge of Christ and formulation of a doctrine of his work and person in the light of Biblical eschatology. Prerequisite: C.T. 32-33. 3 s.h. Mr. Cushman or Mr. Hall

213. *The Structure of Roman Catholic Thought*. The main characteristics of Roman Catholic theology with consideration of possibilities and limitations in ecumenical conversation with Rome. Prerequisites: C.H. 13 and 14 and H.T. 21. 3 s.h. Mr. Herzog

216. *Kierkegaard Studies*. Critical examination of selected works. Prerequisite: C.T. 32 or permission of the instructor. 3 s.h. Mr. Robinson

224. *Conceptions of Man in Western Thought*. An analysis and interpretation of important types of philosophical and theological theory. 3 s.h. Mr. Richey

300. *Systematic Theology*. Method and structure of systematic theology, the doctrine of God, theological anthropology and Christology. Prerequisite: C.T. 32-33 or equivalent. 3 s.h. Mr. Herzog

303. *The New Hermeneutic and the Concept of History*. A critical examination of key issues in present-day European systematic theology centered in the positions of Fuchs, Ebeling, Moltmann, Ott, and Pannenberg. Prerequisite: C.T. 32-33. 3 s.h. Mr. Herzog

320. *Seminar: Friedrich Schleiermacher*. Critical examination of the dogmatic system. Prerequisite: C.T. 322. 3 s.h. Mr. Herzog

322. *Nineteenth Century European Theology*. Protestant theology from Kant to Herrmann. 3 s.h. Mr. Herzog

323. *Seminar: Bultmann*. Critical examination of representative works, with some consideration of relation to the work of Martin Heidegger. Prerequisite: C.T. 32-33 or permission of the instructor. 3 s.h. Mr. Robinson

325. *Philosophical Theology I*. Main problems in the history of philosophical theology from the pre-Socratics to Descartes. Prerequisite: C.T. 32-33. 3 s.h. Mr. Robinson

326. *Philosophical Theology II*. Main problems of philosophical theology in the modern period. Prerequisite: C.T. 325. 3 s.h. Mr. Robinson

328. *Twentieth Century European Theology*. Critical examination of

*May be taken and grade recorded as Christian Educ. 125.

the thought of selected Protestant theologians from 1900 to 1950. Prerequisite: C.T. 32-33 and permission of the instructor. 3 s.h. *Mr. Herzog*

Christianity and Culture

16. *Contemporary Western Culture.* An analysis of the conceptual commitments in contemporary styles of thought and life as reflected in the natural sciences, philosophy, social analysis, and the arts. 3 s.h. *Mr. Poteat*

80. *The Christian Faith and Tragedy.* An exploration of the tragic view of life as exhibited in selected classic and contemporary works of literature and a comparison of this with Christian belief. 3 s.h. *Mr. Poteat*

81. *Recent and Contemporary Art and Theology.* The study of 19th and 20th century painting and sculpture as documents of contemporary man's apprehension of himself and his world; and as elements in the conversation between Christian faith and culture. 3 s.h. *Mr. Poteat*

230. *The Meaning of Religious Language.* An analysis of the credentials of some typical claims of theism in the light of theories of meaning in recent thought. Prerequisite: C.T. 32-33 or permission of instructor. 3 s.h. *Mr. Poteat*

231. *Seminar in Christianity and Contemporary Thought.* Analytical reading and discussion of such critical cultural analysis as is found in the works of M. Polanyi, Arendt, Trilling, and others, with appraisal of the relevance for theological inquiry. Prerequisite: C.T. 32-33 or permission of instructor. 3 s.h. *Mr. Poteat*

380. *Existentialist Thought.* An analysis of writings of representative thinkers from Kierkegaard to Sartre. Prerequisite: C.T. 32-33, or permission of instructor. 3 s.h. *Mr. Poteat*

Christian Ethics

27. *Christian Ethics.* The central assumptions and principles of the Christian conception of the good life. 3 s.h. *Mr. Beach and Mr. H. Smith*

114. *Christian Social Ethics.* The principles of Christian social policy with reference to domestic, social, political, and economic patterns of contemporary culture. 3 s.h. *Mr. H. Smith*

115. *Christian Social Action in the Local Church.* Christian ethical principles, resources, procedures, and programs for pastoral leadership in parish social action. 2 s.h. *Mr. H. Smith*

122. *Moral Theology in the Nineteenth Century.* Critical and comparative examination of ethical theory as exhibited in the work of representative theologians. 3 s.h. *Mr. H. Smith*

124. *Moral Theology in the Twentieth Century.* Critical and comparative examination of ethical theory as exhibited in the work of William

Temple and selected contemporary theologians. 3 s.h. *Mr. H. Smith*
190. *The Christian Critique of Communism*. Analysis of and alternatives to the dynamic secular ideology from a religious standpoint. 3 s.h. *Mr. Lacy*

194. *The Protestant Church and American Culture*. Analysis from the perspective of Christian ethics of current problems in the interpenetration of Church and culture with explicit reference to the parish setting. 3 s.h. *Mr. H. Smith*

292. *Christian Ethics and International Relations*. An examination of Christian attitudes toward such issues as war and peace, the rule of law, foreign aid, and human rights; and the Church's contribution to international policies and institutions. 3 s.h. *Mr. Lacy*

333. *Seminar: Marxist Ideology and Christian Faith*. Comparative study of Communist and Christian doctrines of man, society, sin, history, ethics, and eschatology. Prerequisite: C.E. 190 or equivalent. 3 s.h. *Mr. Lacy*

389. *Christian Ethics and Contemporary Culture*. A study of the interaction between Christian thought and current secular social theory. Prerequisite: C.E. 27 or its equivalent. 3 s.h. *Mr. Beach*

390. *Current Problems in Christian Ethical Theory*. A critical study, seminar style, of dominant issues in Christian Ethics, through an analysis of a variety of contemporary Christian treatments of such problems as love, justice, community and vocation. Prerequisite: C.E. 27 or its equivalent. 3 s.h. *Mr. Beach*

391. *Historical Types of Christian Ethics I*. A critical study of representative statements of Christian ethical theory, through the early Reformation. Prerequisite: C.E. 27 or its equivalent. 3 s.h. *Mr. Beach*

392. *Historical Types of Christian Ethics II*. A continuation of C.E. 391, from the Reformation through current Christian ethical theory. Prerequisite: C.E. 391. 3 s.h. *Mr. Beach*

393. *The Christian Interpretation of History*. A comparative examination of the chief secular and Christian theories of history current in Western thought. For advanced students. Prerequisite: C.E. 27. 3 s.h. *Mr. Beach*

394. *Christianity and the State*. The relation of the Christian theory of the State to political problems with special consideration of the religious assumptions underlying democratic theory and practice, and of the relationship of Church to State. Prerequisite: C.E. 27. 3 s.h. *Mr. Beach*

IV. Professional Studies

The Care of the Parish

10. *The Church and the Minister's Vocation*. An orientation course for

beginning students, devoted to a consideration of the nature of the Church and the tasks of the ministry. 1 s.h. *Staff*

23. *The Care of the Parish*. A consideration of the pastor's function as leader of the Christian community. 3 s.h. *Mr. Ingram and Others*

146. *Church Building*. The role of the pastor in planning and executing building programs in the local church: architectural considerations and counsel, building requirements and plans. 2 s.h. *Mr. Nesbitt*

147. *Sociological Factors in American Religious Expression*. A study of cultural influences on religious expression as illustrated by the temperance movement, industrialization, New Thought, 20th century revivalism, ecumenism, the leisure revolution and other social phenomena. 2 s.h. *Mr. Schores*

148. *Christian Stewardship and Church Finance*. A seminar to consider the principles of stewardship education, budget making, enlistment in church support. 2 s.h. *Mr. Ingram*

150. *Rural Church and Community*. The structure and dynamic factors shaping the present-day rural community together with their import for the work of the Church. 2 s.h. *Mr. Schores*

151. *The Town and Country Church*. The small church, the circuit church, circuit administration, larger parish and group ministry, and the Town and Country movement. 2 s.h. *Mr. Nesbitt*

152. *Evangelism and the Local Church*. A study of the nature, purposes and methods of contemporary Christian evangelism with special attention to the local church. 2 s.h. *Mr. Kale and Mr. Ingram*

153. *Pastoral Leadership in the Local Church*. A study of the pastor's role in determining the objectives and program of the local church with attention to planning for the church year. 2 s.h. *Mr. Ingram*

154. *The Urban Church*. The function, nature, program, and administration of the effective city church and of the urban minister's distinctive task. 2 s.h. *Mr. Ingram*

155a. *The Polity of the Methodist Church*. The history and present structure of the organization of The Methodist Church. 2 s.h. *Mr. Ingram*

155b. *The Polity of the Baptist Churches*.

155c. *The Polity of the Congregational-Christian Churches*.

155d. *The Polity of the Presbyterian Churches*. *Staff*

157. *Research and Survey for the Parish Minister*. An introduction to basic forms of sociological research as applied to the local church: self-evaluations, religious census, opinion polls, community surveys, use of secular resources and agencies. Field and laboratory methods will be explored through involvement in a research project. 2 s.h. *Mr. Schores*

Field Work Practicum I. Discussion of various aspects of parish work with opportunity for students to seek guidance respecting procedures and problems. Designed especially for students with parish responsibilities. (Fall Semester. Sections arranged.) 1 s.h. *Mr. Schores and Others*

Field Work Practicum II. Required of students expecting summer assignments under the Endowment and Field Work Program. Types of parish service to be discussed. (Spring Semester) 1 s.h. *Mr. Schores and Others*

Christian Education

22. Theology and Christian Nurture. The implications of theology and educational philosophy for the theory and practice of Christian education. 3 s.h. *Mr. Richey*

25. The Church and Christian Nurture. A constructive survey of the local church as a community of Christian nurture: Statement and evaluation of objectives, leadership and resource materials, structural patterns and administrative and supervisory procedures for the church school. 2 s.h. *Mr. Kale*

125. Theological and Psychological Interpretations of Man. (See C.T. 125)

126. Missionary Education in the Local Church. Practical programs for church school, audio-visual aids, preaching, stewardship, and special projects. 2 s.h. *Mr. Lacy and Others*

129. Religion and Personality. Investigation of religious aspects of the origins, structure, and development of selfhood. 3 s.h. *Mr. Richey*

149. The Ministry to the Campus. An examination of the circumstances which have produced, and the unique problems which confront, the ministry on the campus, considered from the perspective of the Christian idea of higher education. 3 s.h. *Staff*

161. Teaching Methods. Basic teaching procedures required by professional and lay workers in the local church. Opportunities are arranged for observation and guided practice in church schools, and/or other institutions. Required for candidates for the M.R.E. degree. 3 s.h. *Mr. Kale*

162. Curriculum Building in the Local Church. An examination of influential theories of and contemporary trends in curriculum construction, together with an evaluation of existing curricula. Actual designing of short units for use in the local church. 3 s.h. *Mr. Kale*

164. Christian Education of Children. The organization and administration of the work of the church with children of the nursery, kindergarten, primary and junior age groups. 2 s.h. *Mr. Kale*

165. Christian Education of Youth. The organization and administration of the youth program in the local church. 2 s.h. *Mr. Kale*

166. Christian Education of Adults. A study of the needs of adults; the materials, methods, and principles of organization for the Christian education of adults. 2 s.h. *Mr. Kale*

167. Theology and the Laity. A study of contemporary lay movements and centers, the ministry and mission of the laity in Church and world,

and the ministry of teaching in the lay renewal of the Church. (For Mid-
dlers and Seniors.) 3 s.h. *Mr. Richey*

169. *Theories of Christian Education.* A critical investigation of current
theories of Christian education. 2 s.h. *Mr. Richey*

Christian Education Practicum. Required of M.R.E. candidates. One
class per week and supervised project. 3 s.h. *Mr. Kale and Others*

Pastoral Care

26. *Introduction to Pastoral Care.* The psychology of personal adjust-
ment and pastoral care. An approach to pastoral care and its place in the
pastor's total ministry grounded in an understanding of the dynamics of
personal adjustment. 3 s.h. *Mr. Goodling and Mr. Williamson*

170. *Introduction to Pastoral Counseling.* The philosophy and tech-
niques of formal counseling through discussions of textual and interview
material. Prerequisite: P.C. 26. 3 s.h. *Mr. Goodling or Mr. Williamson*

171. *Pastoral Care Practicum I.* Pastoral Calls and Personal Counseling.
A study of pastoral calling and personal counseling in the parish ministry.
Prerequisites: P.C. 26 and 170. 2 s.h. *Staff*

172. *Pastoral Care Practicum II.* Marriage and the Family. A consid-
eration of pre-marital and marital counseling and the psychodynamics of
family life. Prerequisites: P.C. 26 and 170. 2 s.h. *Mr. Williamson*

173. *Pastoral Care Practicum III.* The Chaplain in a Rehabilitation
Program. The ministry to those in alcoholic and correctional institutions.
Prerequisites: P.C. 26 and 170. 2 s.h. *Staff*

174. *The Church and Mental Health.* The meaning of the self and the
resources of the church in doctrine and worship in self-fulfillment. 2 s.h.
Mr. Goodling

175. *Advanced Pastoral Care Practicum.* For advanced students who
want additional clinical experience in one of the Pastoral Care Practicum
areas. Consent of the instructor is required. Students may register for
from 1 to 5 s.h. clinic credit. *Staff*

176. *Pastoral Care Practicum IV.* The Psychiatric Setting. Lectures by
staff and ward visits at the Dorothea Dix Hospital in Raleigh. The place
of the minister in a program dealing with the causes, treatment, and pre-
vention of mental illness. Prerequisites: P.C. 26 and 170. 3 s.h. *Mr.
Steininger*

177. *Pastoral Care Practicum V.* The Hospital Ministry. Pastoral care
and counseling with the ill, the dying, bereaved. Prerequisites: P.C. 26
and 170. 2 s.h. and 1 s.h. clinic. *Staff*

179. *Pastoral Care Practicum VI.* Pastoral Care and Persons in Institu-
tions. Staff lectures and ward visits at the Murdoch Center (for the
mentally retarded) and other facilities in the Butner, N.C. complex. 3 s.h.
Staff

188. *Science, Faith and Psychoanalysis.* An analysis of the fundamental categories of the Christian message and psychoanalysis. An exploration into the objectives and the methods of science and the meaning of religion. 3 s.h. *Mr. Williamson*

271. *Clinical Pastoral Training I.* Out-Patient Counseling under psychiatric supervision. 4 s.h. *Staff*

273. *Clinical Pastoral Training II.* The Chaplain in a Rehabilitation program. Twenty hours of supervised clinical training weekly in a rehabilitation institution. 4 s.h. *Staff*

276. *Clinical Pastoral Training III.* The Chaplain in a Psychiatric Setting: the mental hospital.

276A. Full-time 12-week summer quarter. 6 s.h. *Staff*

276B. Twenty hours per week, fall semester. 4 s.h. *Staff*

276C. Twenty hours per week, spring semester. 4 s.h. *Staff*

277. *Clinical Pastoral Training IV.* The Chaplain in the General Hospital setting.

277A. Full-time 12-week summer quarter. 6 s.h.

277B. Twenty hours per week, fall semester. 4 s.h.

277C. Twenty hours per week, spring semester. 4 s.h. *Staff*

The Church at Worship

34. *Workshop in Communication.* Intensive drill in voice, diction, speaking and reading. Enrollment by recommendation of teaching faculty. 1 s.h. *Mr. Rudin*

Preaching

29-30. *Sermon Construction—Theory and Practice.* An investigation of the theory of preaching (first semester). Detailed work in practice preaching and a clinical session each week on the application of theory (second semester). 3 s.h. *Mr. Hall*

31. *Advanced Sermon Practice.* A weekly session of clinical exercises in expository preaching and sermon evaluation for senior students of Vocational Group I. Prerequisite: Pr. 29-30. 1 s.h. *Staff*

181. *Practical Problems in Preaching.* Analysis of selected sermons and discussion of problems facing the preacher in the pulpit. Prerequisite: Pr. 29. 2 s.h. *Mr. Hall*

183. *Expository Preaching—Old Testament.* The exegesis and exposition of selected Old Testament passages for homiletical purposes. Prerequisite: Pr. 29. 2 s.h.

184. *Expository Preaching—The Pauline Epistles.* A study for homiletical purposes of the religious experience and theology of Saint Paul and its influence on ethical theory and practice. Prerequisite: Pr. 29. 3 s.h.

185. *Expository Preaching—Non-Biblical.* An evaluation of drama,

poetry and fiction for homiletical purposes. Prerequisite: Pr. 29. 2 s.h. *Mr. Rice*

187. *Pre-Reformation Preaching*. Sermons, handbooks, and other historical sources studied in relation to Biblical preaching and the liturgical church, the problem of popular ministry and the issues of Christian reform. Prerequisite: C.H. 13. 2 s.h. *Mr. Petry*

193. *Theology and Preaching*. An examination of the relation of systematic theology and homiletical presentation in the sermons of major Christian leaders, past and present. 3 s.h. *Mr. Hall*

Worship and Church Music

134. *Liturgical Reading*. Practice in reading the liturgical materials of the pastoral ministry: Scriptures, prayers, and the rites and seasonal services in the *Methodist Book of Worship*. 2 s.h. *Mr. Rudin*

141. *The Classic Age of the English Hymn*. Eighteenth century development of the English hymn with special reference to Watts and the Wesleys, their precursors and successors. 2 s.h. *Mr. Baker*

178. *Corporate Worship*. The theory and practice of the common worship of the Church, using various manuals of worship. 2 s.h. *Mr. Rudin*

180. *Church Music*. A two-fold study including: (1) A survey of the great monuments of church music, (2) Musicianship, songleading and basic conducting; with an emphasis upon the use of the hymn tunes and other music in the Methodist hymnal. 3 s.h. *Mr. Hanks*

Chapel Choir. Students who successfully complete C.W. 180 before graduation may qualify for credit (to the limit of 2 s.h.) of $\frac{1}{2}$ s.h. for each semester of effective participation in the Chapel Choir. Choir membership (granted by audition) affords opportunity for study of the history and background of church music, and practical consideration of it in the context of public worship. *Mr. Hanks*



The Summer Session of the Divinity School

Summer—1966

Class enrollments will be controlled as occasion may arise so as to secure a fairly even distribution among the courses offered in each term.

First Term: (Registration June 13, Classes begin June 14 and end July 18)

105 (DS) *Studies in Paul*. An investigation of Paul's apostolate based upon the Acts and the Epistles with attention to Paul's theology as reflected in selected passages. 9:20-10:40. 3 s.h. Mr. Efrid

114 (DS) *Christian Social Ethics*. The principles of Christian social policy with reference to domestic, social, political, and economic patterns of contemporary culture. 7:40-9:00. 3 s.h. Mr. H. Smith

320 (DS) *Seminar: Friedrich Schleiermacher*. Critical examination of the dogmatic system. 11:00-12:20. 3 s.h. Mr. Herzog

Second Term: (Registration July 20, Classes begin July 21 and end August 24)

102 (DS) *Christian Apologetics and Modern World Views*. A constructive approach to the Hebrew-Christian understanding of Creator and

creature in the light of contemporary scientific knowledge. 11:00-12:20.
3 s.h. Mr. Robinson

170 (DS) *Introduction to Pastoral Counseling*. The philosophy and techniques of formal counseling through discussions of textual and interview material. 9:20-10:40. 3 s.h. Mr. Williamson

Degrees Conferred at Commencement, 1965

The Degree of Bachelor of Divinity

Kenneth Paul Ambrose
C. Clifford Attkisson, Jr.
William Reuben Bouknight, III
Joseph Cates Bowles
Harold Berger Brown, Jr.
James Lawson Bryan
Franklin B. Buie
Tommy Lee Cassady
James H. Charlesworth
Jerry O'Neil Cook
Lloyd Thomas Cunningham
Thomas Carroll Daily
Linden W. Damschroder
John Paul Davenport
Hubert Trevelyan Davis
Joe Cliff Davis
John M. Dorsey
Denis Chandraraj Dutton
Ralph Hill Eanes, Jr.
Daniel Thomas Earnhardt
Donald Peyton Fortenberry
Daniel P. Freitas
Lloyd Edward Griffith, Jr.
James Allen Hewett
Hubert Sydney Huggins

Harold Benjamin Jayroe
Myung Johnng Kim
James Worth Lineberger, Jr.
Eugene H. Lovell, Jr.
Harold L. May
Ervin Thomas Murphy, Jr.
Francis G. Peterson
Ronald George Ramke
Richmond Allen Ross
Carl Edward Settle
John William Setzer, Jr.
John Lawrence Sharpe, III
Charles Michael Smith
William Monroe Spake, Jr.
Yugo Suzuki
Marion Milton Swann
James E. Taggart
James Snell Underwood, Jr.
Robert Louis Wallace
Herman N. Ward, Jr.
Johnnie J. Williams, Jr.
Arthur John Wilson, III
Edward E. Woodall, Jr.
Louis Herman Woodard
Matthew Augustus Zimmerman, Jr.

The Degree of Master of Theology

Alexander M. Alvord
Samuel Wyndham Anderson
Kenneth Lewis Bohannon
Douglass W. Gilbert
Sheldon Elliot Hermanson
John Robert Himes
Ronald Alva Koonts

William E. Lovell
Chrysostom Manuel
William R. Patton
Frank Caston Perry
Philip Allen Pharr
Gordon LeRoy Roth
William A. Ruth

R. Taylor Scott
John L. Spain, Jr.
Clark A. Thompson

Clay H. Turner
Ichiro Yamauchi

The Degree of Master of Religious Education

Ruth Mandac Arichea
Dorathy Mae Chance

Joan Allen Sanders
Ottalee Smith Winegar

Enrollment 1965-66

Candidates for the Bachelor of Divinity Degree

Adams, James Carl (A.B., Coker College), Darlington, South Carolina
Adams, Lawrence Clay (A.B., Pfeiffer College), Asheville, North Carolina
Adams, Quay Wyatt (A.B., Wofford College), Dillon, South Carolina
Aiken, David Hubert (B.A., Baylor University), Atlanta, Georgia
Albury, George Richard (B.A., Williams College), Coral Gables, Florida
Alexander, Charles (A.B., Birmingham-Southern College), Birmingham, Alabama
Alexander, Robert Earl (A.B., Duke University), Kinston, North Carolina
Allen, Harry A., Jr. (B.S. Wofford College), Charlotte, North Carolina
Allen, John Cornelius III (A.B., Duke University), Burlington, Vermont
Allport, Henry Braxton, Jr. (B.A., Randolph-Macon College), Alexandria, Virginia
Anderson, Thurman Wilson (A.B., Wofford College), Conway, South Carolina
Arnold, Cecil Samuel III (A.B., Wofford College), Darlington, South Carolina
Arrowood, Wayne Dee (B.A., Texas Christian University), Fort Worth, Texas
Ballard, James Donald (A.B., Shaw University), Winston-Salem, North Carolina
Barker, Herbert James (B.A., Berry College), Rome, Georgia
Billings, James Wayne (A.B., Pfeiffer College), Bonlee, North Carolina
Boggan, Robert Edmond, Jr. (A.B., Wofford College), Greensboro, North Carolina
Boles, Johnny James (A.B., Guilford College), Pinnacle, North Carolina
Brown, Blon D. (A.B., High Point College), Statesville, North Carolina
Bullard, Jimmy Edward (A.B., Princeton University), Marietta, Georgia
Burberry, Clyde David (A.B., Kentucky Wesleyan College), Paris, Kentucky
Buzzard, Lynn Robert (A.B., Duke University), Gladstone, Oregon
Cain, Louie Bingham, Jr. (A.B., Lambuth College), Camden, Tennessee
Caldwell, James Franklin (A.B., Tulsa University), Tulsa, Oklahoma
Callahan, John Paul (A.B., Wofford College), Lexington, South Carolina
Campbell, Richard E. (B.A., West Virginia Wesleyan College), Lockport, New York
Campbell, Robert Benjamin (B.A., Columbia College), Troy, North Carolina
Cato, Harold Eugene (A.B., University of North Carolina), Greensboro, North Carolina
Chambers, Alex A. (A.B., Stillman College), Los Angeles, California
Clanton, Robert Alpheus, Jr. (A.B., Pfeiffer College), Madison, North Carolina
Clarke, Clifford Harvey (B.A., Wake Forest College), Chapel Hill, North Carolina
Clarke, William Thomas (A.B., Lambuth College), Savannah, Tennessee
Clifton, Thomas Edward (A.B., William Jewell College), Crystal City, Missouri
Combs, Don Caudill (B.A., Oklahoma City University), Midwest City, Oklahoma
Cook, Reece Edward, Jr. (B.A., Catawba College), Concord, North Carolina

Cooper, James Crawford III (B.A., Campbell College), Henderson, North Carolina
 Cox, Boyce Vernon, Jr. (B.A., Wake Forest College), Winterville, North Carolina
 Cox, Richard Lewis (B.A., University of Maryland), Towson, Maryland
 Coyle, Jimmy Glynn (B.A., Oklahoma City University), Lawton, Oklahoma
 Crutchfield, Charles Newton (B.A., Southern Methodist University), Tulsa, Oklahoma
 Curry, Ben Willard (B.A., Emory University), Miami, Florida
 Curry, Henry Lee (B.A., University of Virginia), Richmond, Virginia
 Davis, Carlton Earl (B.A., North Carolina State College), Goldsboro, North Carolina
 Davis, Creed Shelton, Jr. (B.A., Randolph-Macon College), Richmond, Virginia
 Davis, Gary Wayne (B.A., Morningside College), Nemaha, Iowa
 Dickerson, Dennis Roy, Jr. (A.B., Wofford College), Spartanburg, South Carolina
 Dowda, Robert Ellis (A.B., Birmingham-Southern College), Birmingham, Alabama
 Draper, Howard Dennis, Jr. (A.B., High Point College), Fayetteville, North Carolina
 Duncan, Thomas Jefferson, Jr. (A.B., Greensboro College), Greensboro, North Carolina
 Durbin, Jack Dale (A.B., Florida Southern College), Orlando, Florida
 Echols, Charles Robert (B.S., West Virginia Wesleyan College), Richwood, West Virginia
 Edge, Gerald Lloyd (A.B., Pfeiffer College), Fayetteville, North Carolina
 Ellis, Edgar Heb (A.B., St. Andrews Presbyterian College), Spartanburg, South Carolina
 Ellison, William B. (A.B., High Point College), Summerfield, North Carolina
 Embry, Foster Alvin (A.B., Georgia State College), Marietta, Georgia
 Emerson, Ravis Larry (B.A., Guilford College), Greensboro, North Carolina
 Enders, Henry Steve (B.A., Oklahoma City University), Oklahoma City, Oklahoma
 Falls, Fred (A.B., Pfeiffer College), Kings Mountain, North Carolina
 Fast, Jay Howard (A.B., West Virginia University), Morgantown, West Virginia
 Fearnow, Raymond Morrison (B.A., University of Richmond), Mechanicsville, Virginia
 Ferguson, Horace Taylor (A.B., Atlantic Christian College), Graham, North Carolina
 Ferree, John Koonts (B.A., Vanderbilt University), Nashville, Tennessee
 Finau, Samipeni (L.th., Melborne College of Divinity), Nuku'Alofa, Tonga
 Fowler, William Joseph (B.A., Peabody College for Teachers; M.A., University of Tennessee), Clinton, Tennessee
 Frame, David James (B.A., Drew University), Philadelphia, Pennsylvania
 Franks, Virginia (A.B., University of Chicago; M.Ed., University of Florida), Wrightsville Beach, North Carolina
 Freeman, James Herbert (A.B., Wofford College), Blenheim, South Carolina
 Gaffron, David William (B.S., University of Illinois), Decatur, Illinois
 Gamble, Harry Yandle, Jr. (B.A., Wake Forest College), Roanoke, Virginia
 Gardner, Carlos Owen, Jr. (A.B., Pembroke State College), Hillsboro, North Carolina
 Garrett, Edward Mann, Jr. (A.B., University of Richmond), Richmond, Virginia
 Goh, Francis Sweet-Huat (B.A., West Virginia Wesleyan College), Penang, Malaysia
 Gragg, James Printest (B.A., Oklahoma City University), Ada, Oklahoma
 Grice, Franklin Wilson (A.B., High Point College), Stanley, North Carolina
 Griffith, James Ellis (A.B., Wofford College), Greenville, South Carolina
 Griffin, Augustan Glenn, Jr. (A.B., Atlantic Christian College), Nashville, North Carolina
 Griffith, Randolph Jennings (B.A., Furman University), Saluda, South Carolina
 Grove, John Wesley (A.B., Western Maryland College), Baltimore, Maryland
 Hale, Toby Albert (B.A., Wake Forest College), Kingsport, Tennessee
 Hall, Elmer O. (A.B., High Point College), Gibsonville, North Carolina
 Hamilton, Wayne Bruce (B.S., Wake Forest College), Washington, D.C.
 Hannah, Harry Conclave III (B.A., Ohio Wesleyan University), Atlanta, Georgia
 Hardin, Elliott Wannamaker, Jr. (A.B., Duke University; M.B.A., University of Texas), Rock Hill, South Carolina

Harmon, Samuel Kaiser (A.B., Wofford College), Lexington, South Carolina
 Harris, George Edwin (North Carolina State University), Forest City, North Carolina
 Harris, Roy VanIngen (A.B., Florida Southern College), Orlando, Florida
 Hennessee, Robert L. (A.B., Huntingdon College), Geneva, Alabama
 Herin, Thomas James (A.B., Duke University), Miami, Florida
 Herman, James Franklin (A.B., Pfeiffer College), Bessemer City, North Carolina
 Hobbs, John Whitfield (A.B., University of North Carolina), Wilmington, North Carolina
 Holt, John Sanders (A.B., Duke University), Nashville, Tennessee
 Hood, Gordon Lee (B.S., East Tennessee State University), Church Hill, Tennessee
 Horton, Larnie Glenn (A.B., Morris Brown College), Chapel Hill, North Carolina
 Hunt, Ralph Edward, Jr. (B.A., Mount Union College), Alliance, Ohio
 Huntington, Warren Fielding (A.B., University of Miami), Hialeah, Florida
 Hutchinson, William Wayne (B.A., University of Oklahoma), Hobbs, New Mexico
 Hutton, Clifford Earl (B.A., McMurry College), Grandsfalls, Texas
 Inabinet, Charles Reed (A.B., University of South Carolina), Woodford, South Carolina
 Ingram, Franklin Wade (A.B., Duke University), Columbus, Georgia
 Ivey, Daniel Keith (B.A., New Mexico State University), Las Cruces, New Mexico
 James, Conrad Randal (B.A., Centenary College of Louisiana), Shreveport, Louisiana
 Jamison, Louis Dwight (A.B., Wofford College), North Charleston, South Carolina
 Jaquette, John Paul, Jr. (Ohio Wesleyan University), Newark, Delaware
 Jarvis, Frank Melvin (A.B., High Point College), High Point, North Carolina
 Jenkins, Donald Lee (A.B., High Point College), Salisbury, North Carolina
 Johnson, Oscar (B.S., Agricultural & Technical College of North Carolina), Greensboro, North Carolina
 Johnson, Robert Franklin (A.B., University of Alabama), Jemison, Alabama
 Jones, Royce Paul (B.A., Texas Christian University), Garland, Texas
 Juren, Jerry Jay (A.B., Atlantic Christian College), Timberlake, North Carolina
 Kerr, William Andrew (A.B., West Virginia University), Morgantown, West Virginia
 King, Charles Benjamin (A.B., Randolph-Macon College), Dry Fork, Virginia
 King, Clarence Dewey (A.B., West Virginia University), Morgantown, West Virginia
 Kirk, John Alan (B.A., Evansville College), Oblong, Illinois
 Knott, John Buxton III (A.B., University of North Carolina), Durham, North Carolina
 Kwapong, Daniel Ofei (B.A., University College of the Gold Coast), Akropong Akwapim, Ghana
 LaTorre, Stanley Edward (B.S., The College of Charleston), Charleston, South Carolina
 Leifeste, Dale Irving (B.A., University of South Florida), St. Petersburg, Florida
 Little, James Crichton (A.B., University of Glasgow & Trinity College), Glasgow, Scotland, Great Britain
 Little, Thomas Clarence (A.B., King College), Durham, North Carolina
 Long, James Baxter (A.B., Pfeiffer College), Concord, North Carolina
 Lotspeich, Edgar Sevier (A.B., Duke University), Cincinnati, Ohio
 McCleskey, James Lawrence (A.B., Duke University), Tampa, Florida
 McMurry, Dean Scott (B.A., Baylor University), Decatur, Georgia
 McNeill, William Kirk (A.B., Pfeiffer College), Fayetteville, North Carolina
 Maddry, Hubert Alexander (A.B., Scarritt College), Gretna, Virginia
 Mann, Sam E. (B.A., Birmingham-Southern College), Eufaula, Alabama
 Manthey, Robert Edward (A.B., Western Maryland College), Baltimore, Maryland
 Meeks, Merrill Douglas (B.A., Southwestern at Memphis College), Memphis, Tennessee
 Miller, William Donald (B.A., West Virginia Wesleyan College), Fairmont, West Virginia

Miner, Linda Louella (B.A. Scarritt College), St. Petersburg, Florida
 Mitchell, John David (A.B., Atlantic Christian College), Siler City, North Carolina
 Monson, Robert Clyde (A.B., Wofford College), Florence, South Carolina
 Morgan, Clay Johnson (A.B., Pfeiffer College), Troy, North Carolina
 Morris, William Robert (A.B., Wofford College), Lake View, South Carolina
 Morton, Fred Clare (A.B., Princeton University), Memphis, Tennessee
 Murray, Louis Herman (A.B., Greensboro College), Salisbury, North Carolina
 Neaves, Norman Earl (B.A., Oklahoma City University), Oklahoma City, Oklahoma
 Nelson, Gordon Vernon, Jr. (A.B., Randolph-Macon College), Colonial Heights, Virginia
 Newman, William Winter (B.S., University of North Carolina), Burlington, North Carolina
 Nobles, William Michael (B.S., Richmond Professional Institute), Portsmouth, Virginia
 Nolin, George Damon (A.B., Birmingham-Southern College), Montgomery, Alabama
 Norred, Jimmy Jerry (B.A., LaGrange College), LaGrange, Georgia
 Norton, James Earle (A.B., West Liberty State College), Wheeling, West Virginia
 Oliver, James Ralph (A.B., Duke University), Fairmont, North Carolina
 Osborne, William Homer, Jr. (A.B., Pfeiffer College), Pittsboro, North Carolina
 Parchman, Russell Carver (B.A., McMurry College), Loving, New Mexico
 Parsons, Barbee Olis (A.B., Coker College), Hemingway, South Carolina
 Peters, David Russel (B.A., West Virginia Wesleyan College), Philadelphia, Pennsylvania
 Peterson, Charles Morgan (B.A., West Virginia Wesleyan College), Covington, Virginia
 Pierce, Fred Perry (B.S., University of North Carolina), Burlington, North Carolina
 Pollock, George Lee (A.B., Guilford College), Thomasville, North Carolina
 Pomrenke, Louis F., Jr. (B.A., University of Pittsburgh), Pittsburgh, Pennsylvania
 Poole, Anne Pepper (A.B., Meredith College), Kinston, North Carolina
 Poole, Christopher Lee (B.S., College of Charleston), Wagener, South Carolina
 Potter, Frank Hollister (B.A., Wake Forest College), Beaufort, North Carolina
 Puffenberger, Allen Lee (B.A., University of Richmond), Luray, Virginia
 Ragsdale, William Robbins (A.B., Hampden-Sydney College), Leaksville, North Carolina
 Rankin, Donald Erwin (A.B., Kentucky Wesleyan College), Burlington, Kentucky
 Reskovac, John William (B.A., Oklahoma City University), Oklahoma City, Oklahoma
 Reynolds, Thomas LeRoy (B.A., Furman University), Clifton Forge, Virginia
 Richichi, Thomas Joseph (B.A., Oklahoma City University), Oklahoma, City, Oklahoma
 Rink, James Michael (B.A., Adrian College), Adrian, Michigan
 Roberts, Donald Lee (B.S., Lamar State College of Technology), Port Arthur, Texas
 Robertson, Stanley Joe (B.A., Alma College), Grayling, Michigan
 Roe, James Edward (B.S., Bradley University), Peoria, Illinois
 Rouse, Benjamin Charles (A.B., High Point College), Kinston, North Carolina
 Sawyer, Lloyd Alfonza (B.A., North Carolina College), Roper, North Carolina
 Scherf, Theresa (B.A., Huntingdon College), Montgomery, Alabama
 Sell, Jesse Jeremiah (B.A., Ohio Wesleyan University), Toledo, Ohio
 Shannon, Sylvester Lorenzo (A.B., Florida A & M University), Saint Petersburg, Florida
 Sharp, Robert Thomas (B.A., Millsaps College), Meridian, Mississippi
 Sharpe, Jack Larry (A.B., Birmingham-Southern College), Langdale, Alabama
 Shelton, Ruffin Page (A.B., Duke University), Durham, North Carolina
 Singleton, Homer Carleton, Sr. (B.A., University of Alabama), Foley, Alabama
 Six, Walter Ellsworth (B.A., University of Tampa), Sharonville, Ohio
 Smith, Gerald LaFayette (B.A., University of Richmond), Fredericksburg, Virginia

Stanley, Harold Dallas (B.A., North Carolina Wesleyan College), Roxboro, North Carolina

Steed, Roy Glenn, Jr. (A.B., High Point College), Ca-Vel, North Carolina

Steuart, Thomas Albert (B.S., University of Florida), Gainesville, Florida

Stillman, David G. (B.A., The American University), Syracuse, New York

Stith, Frank Albert III (A.B., Duke University), Winston-Salem, North Carolina

Stokes, Clarence O. (A.B., St. Andrews Presbyterian College), Camden, South Carolina

Stokes, James Carlisle (A.B., Duke University; LL.B., Duke Law School), Asheboro, North Carolina

Taylor, Oliver Franklin (B.A., Florida Southern College), Miami, Florida

Thomas, Herman E. (B.S., A & T College of North Carolina), Bryson City, North Carolina

Thompson, David Clark (B.A., Florida State University), Lakeland, Florida

Thompson, George Edward (A.B., Pfeiffer College), Forest City, North Carolina

Thompson, Henry Churchill (A.B., High Point College), Graham, North Carolina

Thompson, James Richard (B.A., Centre College of Kentucky), Paducah, Kentucky

Thompson, Roger Everett (B.S., East Carolina College), Hoffman, North Carolina

Tisdale, Wade Hampton, Jr. (A.B., Westminster College) Boonville, Missouri

Tise, Larry Edward (A.B., Duke University), Winston-Salem, North Carolina

Tobing, Robert Lumban (B.Th., Trinity College, Singapore), Medan, Indonesia

Toothman, Stephen Philip (A.B., Fairmont State College), Fairview, West Virginia

Troll, Fredrie Harold (B.A., University of Richmond), Mansfield, Ohio

Turnbow, Frankie Lee (B.S., Florence State College), Jasper, Alabama

Turner, Frank Blair (A.B., Pfeiffer College), Charlotte, North Carolina

Tyndall, Leslie Glenn (A.B., Duke University), Kinston, North Carolina

Tyson, Carson Stanley (B.A., North Carolina Wesleyan College), Durham, North Carolina

Wade, David Lee (B.A., Randolph-Macon College), Arlington, Virginia

Wade, Zoe Lee (B.A., Shorter College), Crystal River, Florida

Waller, James (A.B., The University of North Carolina), Kinston, North Carolina

Walters, Richard Paul (B.A., Millsaps College), Greenville, Mississippi

Washburn, Phillip Seely (A.B., Dickinson College), South Orleans, Massachusetts

Watson, Henry Douglas (B.A., Emory & Henry College), Arlington, Virginia

Weidman, Judith Lynne (B.A., DePauw University), Savanna, Illinois

Weisner, Billy Julian (B.A., Presbyterian College), Piedmont, South Carolina

Welch, Rock Elliott (A.B., Oberlin College & Austin Presbyterian Seminary), Seabrook, Texas

Wellman, Dana Richard (A.B., University of North Carolina), Annandale, Virginia

White, Charles Denny, Jr. (A.B., Duke University), Asheboro, North Carolina

Wicker, Leslie Cleveland (A.B., Greensboro College), Louisburg, North Carolina

Wilder, John William (B.A., Huntington College), Fairfax, Alabama

Wilson, Leighton Marion, Jr. (B.A., Furman University), Tampa, Florida

Wilson, Ronald Lynn (B.S., Howard College), Birmingham, Alabama

Winegar, Grady Clarence (B.A., Emory & Henry College), Gate City, Virginia

Winter, David Earl (B.A., West Virginia Wesleyan College), South Charleston, West Virginia

Wogan, Sidney F. (LL.B., Southeastern University), Ft. Walton Beach, Florida

Wood, Roger Wayne (B.A., Wofford College), Spartanburg, South Carolina

Wortman, Manuel David (A.B., High Point College), Lavndale, North Carolina

Yeo, Lawrence Thomas (B.A., Wesleyan University), Newton, Massachusetts

Candidates for the Master of Theology Degree

- Bornkamm, Hans Heinrich (University of Heidelberg) Heidelberg, Germany
Brown, Ronald G. (B.S., University of Tennessee; B.D., Southern Baptist Theological Seminary), Madison, Tennessee
Daily, Thomas Carroll (B.A., Emory & Henry College; B.D., Duke University), Laredo, Texas
Darnell, David Rancier (B.A., Florida Christian College; B.D., Brite College of the Bible), Fayetteville, North Carolina
Earnhardt, Daniel Thomas (A.B., High Point College; B.D., Duke University), Durham, North Carolina
Eller, Max A. (B.A., Wake Forest College; B.D., Southeastern Baptist Theological Seminary), Troutman, North Carolina
Goldston, Thomas Jennings (B.A., Bridgewater College; B.D., Crozer Theological Seminary), South Boston, Virginia
Haruyama, Justin (A.B., University of California; M.A., Columbia University), Berkeley, California
Kyriakakis, James (B.A., Holy Cross Greek Orthodox Theological School), Durham, North Carolina
Lawing, Luther Harold (A.B., University of North Carolina; B.D., Duke University), Charlotte, North Carolina
Lee, Mrs. Chong Mahn (B.D., Han Kuk Theological Seminary; M.R.E., Pittsburgh Theological Seminary), Seoul, Korea
Lewis, Robert Russell (B.A., Furman University; B.D., Southeastern Baptist Theological Seminary), Ocean Drive Beach, South Carolina
Manley, John Ruffin (B.A., B.D., Shaw University), Chapel Hill, North Carolina
Newman, William Warren (B.A., Texas Christian University; B.D., Brite Divinity School), Tyler, Texas
Sessions, Dale Robert (A.B., Carson-Newman College; B.D., Southeastern Baptist Theological Seminary), Columbia, South Carolina

Candidates for the Master of Religious Education Degree

- Ahn, Joon Hwa (B.A., Kakhak College), Seoul, Korea
Beals, Emily Jarrett (B.S., Florida State University), North Miami, Florida
Burrier, Judith Ann (A.B., High Point College), Charlotte, North Carolina
Chance, Betty Sherryll (B.A., Millsaps College), Canton, Mississippi
Key, Carter Fay (A.B., Emory University), Swainsboro, Georgia
Renegar, Karen Ruth (B.A., Emory & Henry College), Radford, Virginia
Theis, John Joseph, Jr. (B.S., Pittsburgh Kansas State College), Weir City, Kansas
Turnipseed, Martha (B.A., Birmingham-Southern College), Niagara Falls, New York

Special Students

- Cecil, John Harley (B.S., High Point College; B.D., Emory University), Butner, North Carolina
Gminder, Albert B. (A.B., Catawba College; M.A., Ph.D., University of North Carolina), Elon College, North Carolina
Kempfer, Charles Carson (B.A., Bridgewater College), Alton, Virginia
McDaniel, Frances Brandon (B.S., University of Richmond; M.A., Presbyterian School of Christian Education), Newport News, Virginia
Norris, Frank Bonnie III (A.B., Davidson College), Gastonia, North Carolina
Spake, William Monroe, Jr. (A.B., High Point College), Asheville, North Carolina
Stokes, Donna Faye (B.A., Shorter College), Hapeville, Georgia

Tyson, Charles Edward (B.D., Southeastern Baptist Theological Seminary), Asheboro,
North Carolina
Volz, Walter David (B.D., Concordia Seminary), Raleigh, North Carolina

Summer Session 1965 **(without duplication)**

Brusati, John F. (B.A., Southwestern College), Elmhurst, Illinois
Clark, Richard Alan (A.B., University of North Carolina; B.D., Duke Divinity
School), Statesville, North Carolina
Cohen, Conrad (A.B., Western Maryland College), Milford, Delaware
Felder, Charles Bertram (B.A., Millsaps College), Liberty, Mississippi
May, Henry Elmer, Jr. (B.A., Moravian College; B.D., Moravian Theological Semi-
nary), Winston-Salem, North Carolina
Morgan, Gerald (A.B., High Point College), High Point, North Carolina
Rice, Jerry Lee (B.A., The College of the Ozarks; B.D., McCormick Theological Semi-
nary), Salem, Ohio
Thompson, Albert Eryne, Jr. (A.B., High Point College), Henderson, North Carolina

Enrollment in Graduate Program of Religion 1965-66

- Battistone, Joseph J. (B.A., La Sierra College; M.A., Andrews University; B.D., Harvard Divinity School), Coolidge, Arizona
- Bedell, George C. (B.A., University of the South; B.D., Virginia Theological Seminary, Alexandria), Tallahassee, Florida
- Burr, David D. (A.B., Oberlin College; B.D., Union Theological Seminary, NYC), Dalton, Massachusetts
- Cain, Marvin F. (B.S., Washington State University; B.D., Lutheran Theological Seminary, Gettysburg, Pa.; Th.M., Union Theological Seminary, Richmond), Richmond, Virginia
- Charlesworth, James H. (B.A., Ohio Wesleyan University; B.D., Duke Divinity School), Ponte Vedra Beach, Florida
- Crofts, Richard A. (B.A., Georgetown College; B.D., Southern Baptist Theological Seminary), Anchorage, Kentucky
- Davis, Thomas R. (A.B., Dartmouth College; B.D., Union Theological Seminary, NYC), Scranton, Pennsylvania
- Eshbaugh, Howard (A.B., Grove City College; B.D., Western Theological Seminary; Th.M., Pittsburgh Theological Seminary), Oakdale, Pennsylvania
- Gill, Jerry H. (B.A., Westmont College; M.A., University of Washington; STB, Biblical Seminary, NYC), Seattle, Washington
- Good, Harold H. (B.A., Goshen College; B.D., Goshen College Biblical Seminary), Ontario, Canada
- Goodman, William R., Jr. (B.A., Washington & Lee University; B.D., Union Theological Seminary, Richmond), Lexington, Virginia
- Gramley, William E. (A.B., Davidson College; B.D., Moravian Theological Seminary, Bethlehem, Pennsylvania), Winston-Salem, North Carolina
- Gravely, William B. (B.A., Wofford College; B.D., Drew Theological School), Pickens, South Carolina
- Himes, John R. (A.B., Wittenberg University; B.D., Duke Divinity School; Th.M., Duke Divinity School), London, Ohio
- Jones, Donald L. (A.B., Ohio Wesleyan University; B.D., Methodist Theological School in Ohio), Delaware, Ohio
- Koenning, Alton R. (B.A., Texas Lutheran College; B.D., Evangelical Theological Seminary, Columbus), Ganado, Texas
- Lord, James R. (B.A., Presbyterian College; B.D., Princeton Theological Seminary; Th.M., Duke Divinity School), Dublin, Georgia
- Miller, Gene (A.B., Anderson College; B.D., Anderson School of Theology), Anderson, Indiana
- Moretz, Rufus L. (A.B., Lenoir Rhyne College; B.D., Lutheran Theological Southern Seminary), Columbia, South Carolina

Morrill, Richard L. (B.A., Brown University; B.D., Yale Divinity School), Weymouth, Massachusetts

Mount, C. Eric, Jr. (B.A., Southwestern at Memphis; B.D., Union Theological Seminary, Richmond; S.T.M., Yale Divinity School), Crossett, Arkansas

Page, Allen F. (B.A., Wake Forest College; B.D., Union Theological Seminary, NYC), Morrisville, North Carolina

Parrent, Allan M. (B.A., Georgetown College; M.A., Vanderbilt University; B.D., Vanderbilt Divinity School), Frankfort, Kentucky

Patteson, Roy K., Jr. (B.A., University of Richmond; B.D., Union Theological Seminary, Richmond; Th.M., Duke Divinity School), Pittsboro, North Carolina

Peery, William P. (B.A., Newberry College; B.D., Lutheran Theological Southern Seminary; M.A., Vanderbilt University), Spartanburg, South Carolina

Pelkonen, John P. (A.B., Wittenberg University; B.D., Hamma Divinity School, Springfield, Ohio), Fort Walton Beach, Florida

Pelt, Michael R. (A.A., Chipola Junior College; B.A., Troy State Teachers College; B.D., Duke Divinity School), Mount Olive, North Carolina

Prust, Richard C. (B.A., University of Wisconsin; B.D., Yale Divinity School), Milwaukee, Wisconsin

Ray, Roger D. (B.A., Baylor University; B.D., Southern Baptist Theological Seminary), Corsicana, Texas

Rice, Charles L. (B.A., Baylor University; Southern Baptist Theological Seminary; S.T.M., Union Theological Seminary, NYC), Costa Mesa, California.

Ridenhour, Thomas E. (A.B., Davidson College; B.D., Lutheran Southern Seminary), Concord, North Carolina

Roetzel, Calvin J. (A.B., Hendrix College; B.D., Perkins School of Theology), Tulsa, Oklahoma

Sallstrom, John E. (B.A., Elmhurst College; B.D., Union Theological Seminary, NYC), Quincy, Illinois

Scott, R. Taylor (B.S., University of Virginia; B.D., Virginia Theological Seminary; Th.M., Duke Divinity School), Richmond, Virginia

Stephenson, Keith D. (B.A., University of Nebraska; B.D., S.T.M., Yale Divinity School), Durham, Connecticut

Stines, James W. (B.A., Wake Forest College; B.D., Southern Baptist Theological Seminary, Phila.), Durham, North Carolina

Tatum, W. Barnes (B.A., Birmingham-Southern College; B.D., Duke Divinity School), Mobile, Alabama

Thursby, Gene R. (B.A., Oberlin College; B.D., Graduate School of Oberlin College), Akron, Ohio

Webster, Charles A., Jr. (A.B., Duke University; B.D., Southern Baptist Theological Seminary, Wake Forest), Clemson, South Carolina

White, Marcia (B.A., Wake Forest College), Forest City, North Carolina

Wilbanks, Dana W. (B.A., Trinity University; B.D., Union Theological Seminary, NYC), El Paso, Texas

Wiley, David N. (B.A., College of Wooster; B.D., McCormick Theological Seminary), Chicago, Illinois

Zinn, Grover A., Jr. (B.A., Rice Institute; B.D., Duke Divinity School), El Dorado, Arkansas

Enrollment Summary

Divinity School Students (220 B.D., 15 Th.M., 8 M.R.E., 9 special), academic year, 1965-66, 252; Summer Session (without duplication), 8; Graduate Program of Religion Students, academic year 1965-66, 43; Total, 303.

(The statistics below do not include students of the Graduate Program of Religion.)

Institutions Represented

A & T College of North Carolina	2	East Tennessee State University	1
Adrian College	1	Emory & Henry College	4
Alma College	1	Emory University	3
Atlantic Christian College	4	Evansville College	1
Austin Presbyterian Seminary	1	Fairmont State College	1
Baylor University	2	Florence State College	1
Berry College	1	Florida A & M University	1
Birmingham-Southern College	6	Florida Southern College	3
Bradley University	1	Florida State University	2
Bridgewater College	1	Furman University	3
Brite College of the Bible	1	Georgia State College	1
Brite Divinity School	1	Greensboro College	3
Campbell College	1	Guilford College	3
Catawba College	1	Hampden-Sydney College	1
Centenary College of Louisiana	1	High Point College	16
Centre College of Kentucky	1	Holy Cross Orthodox Theological	
Coker College	2	Seminary	1
College of Charleston	2	Howard College	1
Columbia College	1	Huntington College	3
Columbia University	1	Kakhak College, Seoul, Korea	1
Concordia Seminary	1	Kentucky Wesleyan College	2
Crozer Theological Seminary	1	King College	1
Davidson College	1	LaGrange College	1
DePauw University	1	Lamar State College of Technology . .	1
Dickinson College	1	Lambuth College	2
Drew University	1	McCormick Theological Seminary . . .	1
Duke University	16	McMurry College	2
East Carolina College	1	Melbourne College of Divinity	1

Meredith College	1	Stillman College	1
Millsaps College	4	Texas Christian University	2
Moravian Theological Seminary	1	The American University	1
Morningside College	1	Trinity College of the University of Glasgow	1
Morris Brown College	1	Trinity College, Singapore	1
Mount Union College	1	Tulsa University	1
New Mexico State University	1	University College of the Gold Coast	1
North Carolina College	1	University of Alabama	2
North Carolina State College of the Univ. of N.C.	2	University of Florida	2
North Carolina Wesleyan College ...	2	University of Heidelberg	1
Oberlin College	1	University of Illinois	1
Ohio Wesleyan University	3	University of Maryland	1
Oklahoma City University	8	University of Miami	1
Pembroke State College	1	University of North Carolina	9
Pfeiffer College	12	University of Pittsburgh	1
Pittsburgh Kansas State College	1	University of Richmond	5
Pittsburgh Theological Seminary	1	University of South Carolina	1
Presbyterian College	1	University of South Florida.....	1
Presbyterian School of Christian Education		University of Tampa	1
Princeton University	2	University of Tennessee	1
Randolph-Macon College	5	University of Texas	1
Richmond Professional Institute	1	University of Virginia	1
Scarritt College	2	Vanderbilt University	1
Shaw University	2	Wake Forest College	6
Shorter College	2	Wesleyan University	1
Southeastern Baptist Theological Seminary	4	West Liberty State College	1
Southeastern University	1	West Virginia University	2
Southern Baptist Theological Seminary.....	1	West Virginia Wesleyan College ...	7
Southern Methodist University	1	Western Maryland College	3
Southwestern at Memphis College	1	Westminster College	1
Southwestern College	1	William Jewell College	1
St. Andrews Presbyterian College ...	2	Williams College	1
		Wofford College	14

Denominations Represented

Methodist	202	African Methodist Episcopal	1
Baptist	23	Christian Methodist	1
Presbyterian	6	Congregational Christian	1
United Church of Christ	5	Eastern Orthodox	1
Lutheran	4	Moravian	1
United Presbyterian	3	Presbyterian Church of Ghana	1
Episcopal	2	Presbyterian Church of Scotland	1
Christian Church, Disciples	2	Salvation Army	1
Church of God	2	No Denomination Listed	1
Southern Baptist	2		

260

Geographical Distribution

North Carolina	88	Virginia	23
South Carolina	24	Florida	17

Georgia	10	Michigan	2
Alabama	10	California	2
Tennessee	10	Korea	2
Oklahoma	9	Washington, D.C.	1
West Virginia	8	Louisiana	1
Texas	7	Vermont	1
Ohio	6	Iowa	1
Illinois	5	Oregon	1
Mississippi	4	Kansas	1
Kentucky	3	Germany	1
Maryland	3	Tonga, South Pacific ..	1
New Mexico	3	Malaysia	1
Pennsylvania	3	Ghana	1
New York	3	Scotland	1
Delaware	2	Indonesia	1
Massachusetts	2	<i>States: 29</i>	
Missouri	2	<i>Foreign Countries: 7</i>	



BULLETIN OF DUKE UNIVERSITY

College of Engineering
1966

Annual Bulletins

For *Bulletin of Information for Prospective Students*, apply to The Registrar, Duke University, Durham, N. C.

For *Bulletin of Undergraduate Instruction*, apply to The Registrar, Duke University, Durham, N. C.

For *Bulletin of The College of Engineering*, apply to The Registrar, Duke University, Durham, N. C.

For *Bulletin of The Divinity School*, apply to The Dean of the Divinity School, Duke University, Durham, N. C.

For *Bulletin of The School of Forestry*, apply to The Dean of the School of Forestry, Duke University, Durham, N. C.

For *Bulletin of The Graduate School of Arts and Sciences*, apply to The Dean of the Graduate School, Duke University, Durham, N. C.

For *Bulletin of The School of Law*, apply to The Dean of the School of Law, Duke University, Durham, N. C.

For *Bulletin of The School of Medicine*, apply to The Dean of the School of Medicine, Duke University, Durham, N. C.

For *Bulletin of The School of Nursing*, apply to The Dean of the School of Nursing, Duke University, Durham, N. C.

For *Bulletin of The Summer Session*, apply to The Director of the Summer Session, Duke University, Durham, N. C.

Published by Duke University monthly except in July, August, September, and December. Entered as second-class matter March 25, 1929, at the Post Office of Durham, North Carolina, under the Act of August 24, 1912.

Statement of Ownership, Management, and Circulation

Date of Filing: May, 1966

Title of Publication: Bulletin of Duke University.

Frequency of Issue: 13 per calendar year.

Location of Known Office of Publication: 111 Allen Building, Duke University, Durham, North Carolina.

Location of the Headquarters or General Business Offices of the Publishers: Same.

Name and Address of Publisher: Duke University, Durham, North Carolina.

Name and Address of Editor: Dr. Richard L. Tuthill, Registrar, Duke University, Durham, North Carolina.

Name and Address of Managing Editor: Mrs. Sandra Simmons, Assistant to the Registrar, Duke University, Durham, North Carolina.

Owner: Duke University, Durham, North Carolina.

Known Bondholders, Mortgages, and Other Security Holders: None.
(Act of October, 1962: Section 4369. Title 39 U.S. Code)

BULLETIN OF DUKE UNIVERSITY

College of Engineering
1966

Durham, North Carolina 1966

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Calendar of the College 1966-1967

September

- 16 Friday, 7:30 p.m.—Freshman Week begins: Assemblies for all new students entering the College of Engineering, Trinity College, and the Woman's College
- 19 Monday—Registration and matriculation of all students of the College of Engineering, Trinity College, and the Woman's College, who have not pre-registered. Registration of graduate students
- 21 Wednesday, 8:00 p.m.—University Convocation. Indoor Stadium
- 21 Wednesday—Final Registration of pre-registered students
- 22 Thursday, 8:10 a.m.—Fall semester classes begin

November

- 5 Saturday—Last day for reporting six-weeks grades
- 14-17 Pre-registration for Spring Semester 1967
- 23 Wednesday, 12:30 p.m.—Thanksgiving recess begins
- 28 Monday, 8:10 a.m.—Classes are resumed

December

- 11 Sunday—Founders' Day
- 20 Tuesday, 12:30 p.m.—Christmas recess begins

January

- 3 Tuesday, 8:10 a.m.—Classes are resumed
- 14 Saturday, 12:30 p.m.—Fall semester classes end
- 17 Tuesday—Final Examinations begin
- 27 Friday—Final Examinations end
- 31 Tuesday—Registration and matriculation of new students

February

- 1 Wednesday—Last day for matriculation for the spring semester
- 2 Thursday, 8:10 a.m.—Spring semester classes begin

March

- 15 Wednesday—Last day for reporting six-weeks grades
- 24 Friday, 12:30 p.m.—Spring recess begins

April

- 3 Monday, 8:10 a.m.—Classes are resumed
- 10–13 Pre-registration for Summer Session and Fall Semester 1967

May

- 18 Thursday, 5:00 p.m.—Spring semester classes end
- 20 Saturday—Final examinations begin
- 31 Wednesday—Final examinations end

June

- 3 Saturday—Commencement begins
- 4 Sunday—Commencement Sermon
- 5 Monday—Graduating Exercises

(For complete calendar of *The Graduate School*, refer to *Bulletin of the Graduate School of Arts and Sciences*.)



Officers of the College

General University Administration

Douglas Maitland Knight, Ph.D., LL.D., Litt.D., L.H.D., *President of the University*

Robert Taylor Cole, Ph.D., *Provost*

Gerhard Chester Henriksen, M.A., C.P.A., *Vice President for Business and Finance and Treasurer*

Everett Harold Hopkins, Ph.D., *Vice President for Planning and Institutional Studies and Assistant Provost*

Frank Leon Ashmore, A.B., *Vice President for Institutional Advancement*

Charles Edward Jordan, A.B., LL.D., *Vice President for University Relations*

Frank Traver de Vyver, Ph.D., *Vice Provost*

Harold Walter Lewis, Ph.D., *Dean of Arts and Sciences and Vice Provost*

Barnes Woodhall, M.D., *Vice Provost*

Benjamin Edward Powell, Ph.D., *Librarian*

Richard Lovejoy Tuthill, Ed.D., *University Registrar*

Craufurd David Goodwin, Ph.D., *Assistant Provost and Secretary*

Edwin Constant Bryson, LL.B., *University Counsel*

Engineering Administration

James Lathrop Meriam, Ph.D., *Dean and Director of Research and Development*

Charles Rowe Vail, Ph.D., *Associate Dean for Graduate Study and Research*

Edward Kready Kraybill, Ph.D., *Assistant Dean*

Richard Lionel Predmore, D.M.L., *Dean of The Graduate School of Arts and Sciences*

Robert B. Cox, A.M., *Dean of Undergraduate Men*

Everett Broadus Weatherspoon, A.B., *Director of Admissions, College of Engineering and Trinity College*

Earl Ivan Brown, II, Ph.D., *Chairman and Director of Graduate Studies, Department of Civil Engineering*
Edward Henry Bryan, Ph.D., *Director of Undergraduate Studies, Department of Civil Engineering*
Thomas George Wilson, Sc.D., *Chairman, Department of Electrical Engineering*
Otto Meier, Jr., Ph.D., *Director of Undergraduate Studies, Department of Electrical Engineering*
Harry Ashton Owen, Jr., Ph.D., *Director of Graduate Studies, Department of Electrical Engineering*
Van Leslie Kenyon, Jr., M.M.E., *Acting Chairman and Director of Undergraduate and Graduate Studies, Department of Mechanical Engineering*
Mrs. Dorothy Holt McElduff, A.B., *Recorder*



Faculty

Department of Civil Engineering

Chairman and Director of Graduate Studies: Earl Ivan Brown, II

Director of Undergraduate Studies: Edward Henry Bryan

*Earl Ivan Brown, II (1960), Ph.D. (Texas), *J. A. Jones Professor of Civil Engineering*

*Edward Henry Bryan (1960), Ph.D. (Wisconsin), *Professor of Civil Engineering*

*Aleksandar Sedmak Vesić (1964), D.Sc. (Belgrade), *Professor of Civil Engineering*

*David William Hill (1962), Ph.D. (Stanford), *Associate Professor of Engineering Mechanics*

*Aubrey Edwin Palmer (1944), C.E. (Virginia), *Associate Professor of Civil Engineering*

*K. Pete Arges (1953), M.S.C.E. (Tennessee), *Assistant Professor of Civil Engineering*

Furman Wyche Barton (1964), Ph.D. (Illinois), *Assistant Professor of Civil Engineering*

Paul Harrawood (1956), M.S.C.E. (Missouri at Rolla), *Assistant Professor of Civil Engineering*

*Clyde Nelson Holland (1957), M.S. (Duke), *Assistant Professor of Civil Engineering*

Don James Wood (1962), Ph.D. (Carnegie Tech), *Assistant Professor of Civil Engineering*

*Frederick Gayle Sheppard (1962), B.S.C.E. (Duke), *Instructor in Civil Engineering*

*Registered Professional Engineer.

Paul William Abeles (1965), D.Sc. (Vienna), *Visiting Professor of Civil Engineering*
Sudhir Kumar (1958), Ph.D. (Pennsylvania State), *Part-time Visiting Associate Professor of Civil Engineering*

Department of Electrical Engineering

Chairman: Thomas George Wilson
Director of Undergraduate Studies: Otto Meier, Jr.
Director of Graduate Studies: Harry Ashton Owen, Jr.

John Leslie Artley (1955), D.Eng. (Johns Hopkins), *Professor of Electrical Engineering*
Otto Meier, Jr. (1934), Ph.D. (Pennsylvania), *Professor of Electrical Engineering*
Harry Ashton Owen, Jr. (1951), Ph.D. (North Carolina State), *Professor of Electrical Engineering*
*Charles Rowe Vail (1939), Ph.D. (Michigan), *Professor of Electrical Engineering*
*Thomas George Wilson (1959), Sc.D. (Harvard), *Professor of Electrical Engineering*

Robert Mercer Burger (1962), Ph.D. (Brown), *Adjunct Associate Professor of Electrical Engineering*
Robert Blackburn Kerr (1965), D.Eng. (Johns Hopkins), *Associate Professor of Electrical Engineering*
*Edward Kready Kraybill (1939), Ph.D. (Michigan), *Associate Professor of Electrical Engineering*
*Bruce Arrington Wells (1964), M.S.E.E. (Oregon State), *Associate Professor of Electrical Engineering*

Rhett Truesdale George, Jr. (1957), Ph.D. (Florida), *Assistant Professor of Electrical Engineering*
Herbert Hacker, Jr. (1965), Ph.D. (Michigan), *Assistant Professor of Electrical Engineering*
Theo Clyde Pilkington (1958), Ph.D. (Duke), *Assistant Professor of Electrical Engineering*

Aram Khatchik Hampikian (1965), Docteur de l'Université de Paris, *Visiting Lecturer in Electrical Engineering*
†Billy Brown Olive (1957), B.S. in E.E. (Duke); LL.B. (St. John's), *Lecturer in Electrical Engineering*

*Registered Professional Engineer.

†Registered Patent Attorney.

- †John Bowen Ross, Jr. (1965), B.S. in M.E. (Duke); LL.B. (Duke), *Visiting Lecturer in Electrical Engineering*
- *Philip Harold Trickey (1965), M.S.E.E. (Maine), *Lecturer in Electrical Engineering*
- Jimmie Jack Wortman (1964), Ph.D. (Duke), *Lecturer in Electrical Engineering*

Department of Mechanical Engineering

- *Chairman: Jack B. Chaddock
- ‡Acting Chairman and Director of Undergraduate and Graduate Studies: Van Leslie Kenyon, Jr.
- *Van Leslie Kenyon, Jr. (1945), M.M.E. (Delaware), *Professor of Mechanical Engineering*
- *Lambert Sigfred Linderoth, Jr. (1965), M.E. (Iowa State), *Professor of Mechanical Engineering*
- *John Nelson Macduff (1956), M.M.E. (New York University), *Professor of Mechanical Engineering*
- *James Lathrop Meriam (1963), Ph.D. (Yale), *Professor of Engineering Mechanics*
- *Thomas Allan Boyle (1957), M.S.M.E. (Lehigh), *Associate Professor of Mechanical Engineering*
- *Ernest Elsevier (1950), M.S.M.E. (Georgia Institute of Technology), *Associate Professor of Mechanical Engineering*
- *Charles Morgan Harman (1961), Ph.D. (Wisconsin), *Associate Professor of Mechanical Engineering*
- George Wilbur Pearsall (1964), Sc.D. (Massachusetts Institute of Technology), *Associate Professor of Mechanical Engineering*
- *Gale Herbert Buzzard (1957), Ph.D. (North Carolina State), *Assistant Professor of Mechanical Engineering*
- *Ralph Elton Lewis (1941), M.S.M.E. (Illinois), *Assistant Professor of Mechanical Engineering*
- *Thomas Hawkes Nash, Jr. (1959), B.S. (Iowa State), M.A. (North Carolina), *Assistant Professor of Mechanical Engineering*
- *George Edward Bock (1965), M.E. (Columbia), *Visiting Lecturer in Mechanical Engineering*
- Milan Djordjević (1964), Dr.Ing. (Munich), *Visiting Professor of Mechanical Engineering*

*Registered Professional Engineer.

†Registered Patent Attorney.

*Beginning September 1, 1966.

‡Academic year 1965-66.

Engineering Faculty Council

Chairman: Dean J. L. Meriam

Secretary: E. B. Weatherspoon

Civil Engineering: E. I. Brown, II, E. H. Bryan

Electrical Engineering: T. G. Wilson, T. C. Pilkington

Mechanical Engineering: V. L. Kenyon, Jr., L. S. Linderoth

History: Theodore Ropp

Mathematics: F. G. Dressel

Chemistry: J. F. Bonk

General Administration: Provosts R. T. Cole, H. W. Lewis

Ex-Officio: F. C. Joerg, Assistant Dean of Arts and Sciences; C. R. Vail, Associate Dean of Engineering; E. K. Kraybill, Assistant Dean of Engineering

Faculty Committees

Academic Planning: Hill; Harman, Harrawood, Owen, Pearsall, Pilkington

Bulletin: Kraybill; Arges, Harwell, Nash, Meier, Vail

Computer: Wood; Barton, Buzzard, Nash, Owen, Wells

Displays: Elsevier; Holland, Trickey

Educational Facilities: Meriam; Brown, Fairbank, Kenyon, Kraybill, Vail, Wilson

Engineering Building Sub-Committee: Pearsall; Brown, Hill, Kenyon, Meier, Wilson

Engineering Publications Advisory: Barton; George, Harwell

Executive: Meriam; Brown, Kenyon, Kraybill, Vail, Wilson

Freshman Advisory: Kraybill; Artley, Buzzard, Harman, Holland, Lewis, Macduff, Sheppard, Wood

Graduate Studies Committee: Vail; Brown, Kenyon, Owen, Wilson

Guest Speaker Program: Harman; Bryan, Kraybill, Wells

Library: Artley; Axman, Bock, Vesic

Schedule: Kraybill; Elsevier, George, Harrawood, McElduff

Student Activities: ASCE—Harrawood; ASME—Kenyon; Chi Epsilon—Bryan; Engineers Radio Association—Edwards; Engineers Student Council—Pearsall; Eta Kappa Nu—Kraybill; IEEE—Meier; Order of Saint Patrick—Harman, Pi Tau Sigma—Kenyon; Tau Beta Pi—Arges, Harman, Kenyon, Meier

Upperclass Advisors: Arges, Boyle, George, Harrawood, Kenyon, Nash, Palmer, Pilkington, Wells

Faculty Emeritus and Staff

Faculty Emeritus

Harold Crusius Bird, C.E., *Professor Emeritus of Civil Engineering*

Frank Nicholas Egerton, A.M., E.E., *Associate Professor Emeritus of Electrical Engineering*

Howard N. Haines, B.S. in Architecture, *Associate Professor Emeritus of Civil Engineering*

William Holland Hall, A.M., M.S.C.E., *Dean Emeritus, J. A. Jones Professor Emeritus of Engineering*

Walter James Seeley, M.S., *Dean Emeritus, James B. Duke Professor Emeritus of Electrical Engineering*

Ralph Sydney Wilbur, M.E., *Professor Emeritus of Mechanical Engineering*

James Wesley Williams, M.S., *Professor Emeritus of Civil Engineering*

Supporting Staff

Research Associate

Edward Towson Moore (1961), Ph.D. (Duke), *Electrical Engineering*

National Science Foundation Supervised Teaching Interns

Ralph Willet Barnes, Jr. (1964), M.S.E. (University of Pennsylvania), *Electrical Engineering*

Robert Price Biggers (1964), B.S.M.E. (Duke), *Mechanical Engineering*

Larry Tyson Bumgardner (1964), B.S.E.E. (N. C. State), *Electrical Engineering*

Peter Beardsley Crist (1965), B.S.M.E. (Duke), *Mechanical Engineering*

Eugene Anthony Frekko (1964), B.S.E.E. (N. C. State), *Electrical Engineering*

Robert Michael Koerner (1965), M.S.C.E. (Drexel Institute of Technology), *Civil Engineering*

John Oates Woods, Jr. (1964), B.S.C.E. (The Citadel), *Civil Engineering*

Graduate Assistants—Teaching

John Joseph Brealey (1964), B.S.M.E. (Louisiana State), *Mechanical Engineering*

George Buckley (1965), B.Sc. (Royal College of Advanced Technology), *Electrical Engineering*

Eddy Hee Wen Cheng (1965), B.S. (Cheng Kung University), *Mechanical Engineering*

- Yun-Ming Feng (1963), B.S. (National Taiwan University), *Electrical Engineering*
- Jerson Duarte Guimaraes (1965), C.E. (University of Minas Gerais), *Civil Engineering*
- Ram Krishna Lal Joshi (1964), I.Sc. (Tri-Chandra), *Civil Engineering*
- David Teh-yu Kao (1963), B.S. (Cheng Kung University), *Civil Engineering*
- Kun Ha Kim (1964), B.S.M.E. (Duke), *Mechanical Engineering*
- R. Vijay Kumar (1965), B.E. (Osmania University), *Mechanical Engineering*
- Kwang-kiang Lee (1964), B.S. (National Taiwan University), *Civil Engineering*
- Thou-Han Liu (1965), B.S. (Cheng Kung University), *Civil Engineering*
- Tyzz-Dwo Lu (1965), B.S. (National Taiwan University), *Civil Engineering*
- William Sloan Plumer, Jr. (1965), B.S.E.E (Duke), *Electrical Engineering*
- Pedro Jesus Querejeta (1965), B.C.E. (Catholic University), *Civil Engineering*
- Gerd Rechten (1965), Vordiplom (Technical University of Munich), *Electrical Engineering*
- Warren Frank Seagreaves, Jr. (1964), B.S.C.E. (Duke), *Civil Engineering*
- Robert Harris Wyatt (1964), B.S.M.E. (Duke), *Mechanical Engineering*

Graduate Assistants—Research

- Richard Gaylen Absher (1964), M.S.E.E. (University of New Mexico), *Electrical Engineering*
- Ihsan M. H. Bábaá (1961), B.S.E.E. (Illinois Institute of Technology), *Electrical Engineering*
- Roger Coke Barr (1965), B.S. (Duke), *Electrical Engineering*
- William Forrest Chambers (1962), M.S.E.E. (Stanford), *Electrical Engineering*
- George Kyle Coffin, Jr. (1961), M.S. (Duke), *Civil Engineering*
- Leonardo de Vera Cruz (1965), M.S. (Seato Graduate School of Engineering), *Civil Engineering*
- Raul Francisco Esquivel (1965), C.E. (La Universidad, National Antónoma de Mexico), *Civil Engineering*
- William Edward Hammond (1960), B.S.E.E. (Duke), *Electrical Engineering*
- John William Hartwell (1965), B.S. (Duke), *Electrical Engineering*
- Chao-Hsiung Hu (1965), B.S. (Cheng Kung University), *Civil Engineering*

Joseph Marvin Hunt, III (1963), M.S. (N.C. State), *Electrical Engineering*
 Peter Edward Jackson (1962), B.S.E.E. (Duke), *Electrical Engineering*
 Leonidas John Jones (1958), M.S. (Duke), *Electrical Engineering*
 Donald Theodore Meyer (1961), M.A. (Duke), *Electrical Engineering*
 Joe William Morrow (1965), B.S. (Mississippi State), *Civil Engineering*
 Jai Raj Narain Rajan (1960), M.S. (Duke), *Civil Engineering*
 Charles Lowe Rogers (1965), M.S. (Auburn), *Electrical Engineering*
 Surendra Kumar Saxena (1963), M.S. (Duke), *Civil Engineering*
 Cheng-Chuan Shih (1965), M.S. (Virginia Polytechnic Institute), *Civil Engineering*
 Tein-Lie Tai (1965), M.S.C.E. (Georgia Institute of Technology), *Civil Engineering*
 Candler Arthur Willis, Jr. (1964), B.S. (N. C. State), *Electrical Engineering*
 Yuan Yu (1961), B.S. (National Taiwan University), *Electrical Engineering*

Fellows and Trainees

Gordon Powers Boutwell, Jr., M.S.C.E. (Georgia Institute of Technology), *James B. Duke Fellow, Civil Engineering*
 Jerry Clayton Collins, M.S.E.E. (Purdue), *National Science Foundation Trainee, Electrical Engineering*
 Donald Larry Hester, M.S.E.E. (University of New Mexico), *James B. Duke Fellow, Electrical Engineering*
 C. Blake McDowell, III, B.S.E.E. (Duke), *Shell Foundation Fellow, Electrical Engineering*
 Walter Cade Metz, Jr., B.S.E.E. (Duke), *National Science Foundation Trainee, Electrical Engineering*
 Norman Lee Owsley, M.S. (Duke), *National Aeronautics and Space Administration Trainee, Electrical Engineering*
 Robert Bolling Roe, Jr., B.S. (Clemson), *National Aeronautics and Space Administration Trainee, Electrical Engineering*
 William A. Sander, III, B.S. (Clemson), *National Aeronautics and Space Administration Trainee, Electrical Engineering*
 John Marshall Slepetz, M.C.E. (University of Virginia), *National Science Foundation Trainee, Civil Engineering*
 Gerard Pierre-Louis Toussaint, Diploma D'Ingenieur (École National D'Ingenieurs Arts et Metiers de Paris), *Ford Foundation Fellow, Civil Engineering*

Clerical and Technical

Mrs. Donald H. Axman, M.L.S., *Librarian*
 Lester Barham, *Laboratory Technician in Electrical Engineering*

Mrs. Leon S. Brooks, *Secretary, Electrical Engineering Department*
Mrs. Spurgeon G. Buchanan, *Secretary, Dean's Office*
William Glenwood Clayton, *Laboratory Technician in Mechanical Engineering*
Mrs. Jimmy G. Coyle, *Secretary, Civil Engineering Department*
Mrs. Winston E. Crabtree, *Secretary, Mechanical Engineering Department*
Mrs. Jane Culver, *Secretary, Electrical Engineering Department*
Joseph Philip Edwards, *Supervisor of Engineering Services*
Mrs. Jerry T. Edwards, *Secretary, Electrical Engineering Department*
James Edgar Grasty, *Assistant Technician in Mechanical Engineering*
Mrs. James A. Humphries, *Secretary, Dean's Office*
Marvin Primo King, *Laboratory Technician in Civil Engineering*
William Thomas Lessig, *Engineering Illustrator, Central Services*
Miss Lois Mullen, *Secretary to the Dean*
Robert Lee Penley, *Electronics Technician in Electrical Engineering*
James Harold Phillips, *Electronics Technician in Electrical Engineering*
Mrs. James R. Porter, *Secretary, Civil Engineering Department*
Miss Mary Elizabeth Riley, *Secretary, Civil Engineering Department*
Edward Bruce Roberts, *Electronics Technician in Electrical Engineering*
Alonzo George Vaughan, *Laboratory Technician in Civil Engineering*
William V. Ward, *Instrument Maker, Central Services*
David Council Watson, *Bookkeeper in Electrical Engineering*
Mrs. David T. Wells, *Assistant Librarian*



The Profession of Engineering

Engineering has been defined as the profession in which a knowledge of mathematics and the natural sciences is applied to develop ways of utilizing economically the materials and forces of nature for the well-being of mankind. As a *science* it involves mathematics and the natural sciences, as an *art* it involves human imagination and judgment. It is interdisciplinary, and it invokes both the processes of analysis and creative synthesis. The engineer works at the level of principles and concepts, and he seeks to achieve an optimum combination of basic concepts to yield imaginative new solutions to problems.

Engineering has, throughout history, continually interacted with the rest of human society in a highly determinative way. Its influence is evident in the very fabric of our culture. Engineering has provided the means for feeding, clothing, and sheltering mankind. It has largely freed men's bodies from physical drudgery and their minds from the slavery of routine mental effort. It has provided the tools of new scientific discovery, as well as those of new art forms. It has provided the means for bringing to mankind everywhere the results of the creative efforts of the great artists, writers, scientists, and philosophers of both ancient and modern times. It has placed man in close contact with his fellowmen throughout the world, and is now about to place man on the moon. The modern engineer must be broad, as well as deep, in his knowledge and interests, and his education must reflect this fact.

General Information

Engineering at Duke University

Duke University, a privately-supported, church-related (Methodist) institution, has about 6,800 students enrolled in nine schools and colleges. The students annually represent nearly every state and approximately 25 foreign countries. There are now more than 34,000 alumni in 70 nations. The University is a member of the Southern Association of Colleges and Schools, and of the Association of American Universities, which consists of 41 outstanding institutions.

Within the University, the College of Engineering offers programs of instruction and research at all three degree levels: bachelor's, master's, and doctor's. These educational programs in engineering are directed toward the objective of producing engineers who:

- a. are equipped to function at the highest professional level, not only today but for several decades, regardless of the scientific advances that the future may bring, with a fundamental understanding both of the *science* of engineering, which is based on mathematics and the physical sciences, and of the *art* of engineering, which depends on human imagination and judgment;
- b. can function intelligently within the economic and social framework of our culture—able to look from the past through the present into the future in terms of material wants and needs, and who are able to

organize the human effort and financial resources necessary to provide the machines, goods, structures, and services that will meet those needs and wants;

- c. recognize their responsibilities as citizens of their communities; and
- d. seek to continue aesthetic, ethical, intellectual, and spiritual growth.

Both on the campus and in the classroom the emphasis is on the individual. To this end classes are kept small and close contact is maintained between professor and student. As a matter of policy, the College is relatively small, with an undergraduate enrollment of about 500. Master's and doctor's work in engineering is offered through the Graduate School of Arts and Sciences.

History

The College of Engineering traces its origin to 1887, when instruction in engineering subjects was begun by Trinity College. With the establishment of Duke University the program in engineering rapidly evolved to its present status through a series of steps that included the formation of separate departments in civil and electrical engineering in 1927, the formation of a separate department in mechanical engineering in 1931, the establishment of the Division of Engineering, with the three departments as components, in 1937 and, finally, the incorporation of this Division into the University structure in 1939 as the College of Engineering, one of the three coordinate undergraduate colleges of Duke University. The Master of Science degree with a major in engineering was authorized in 1956 and the Doctor of Philosophy was authorized in electrical engineering in 1960 and in civil engineering in 1964, both through the Graduate School of Arts and Sciences.

Relationship to the University

As part of the University community, students in the engineering programs share in a total educational experience that only a major university can provide. The College of Engineering shares the same campus with Trinity College, the Graduate School of Arts and Sciences, the Divinity School, and the Schools of Forestry, Law, Medicine.

Organization

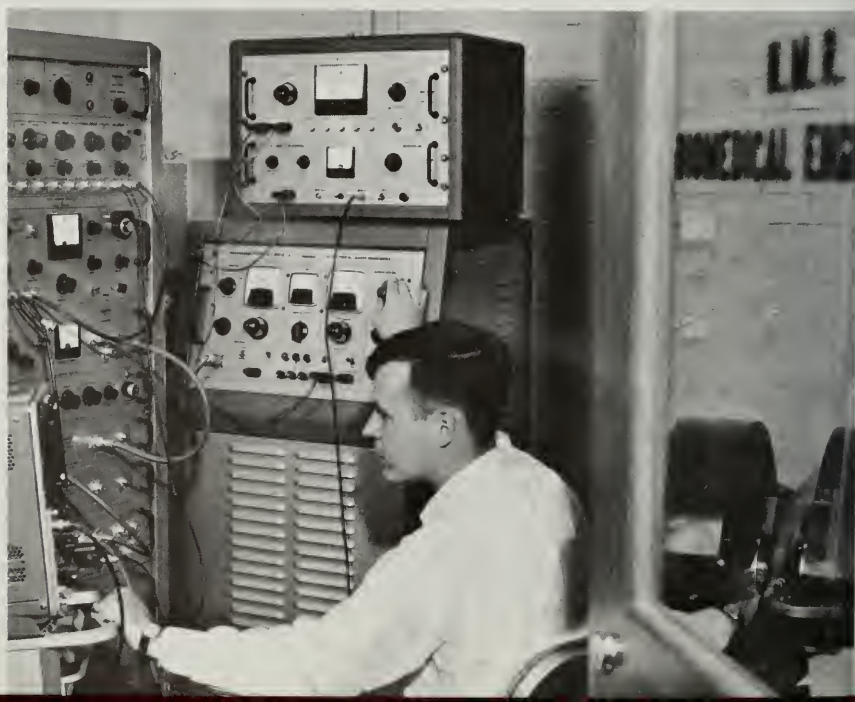
The affairs of the College of Engineering are administered by the Dean of the College, with the assistance of an Executive Committee which

includes the Associate and Assistant Deans and the Chairmen of the three Departments of Engineering. The legislative body of the College is the Engineering Faculty Council, which has responsibility for the curriculum and for determining policies in those academic matters that pertain exclusively to the College. The affairs of each department of engineering are administered by the Chairman of that Department, with the assistance of the Department Faculty. Much of the administrative work of the College is carried out with the assistance of faculty committees.

The graduate programs are administered by the respective engineering departments under the coordination of the Associate Dean for Graduate Study and Research and through the Graduate School of Arts and Sciences.

Physical Plant

The entire College is in a single building on the West Campus. It was first occupied in January 1948. Each of three wings houses the instructional and research laboratories and the special classrooms of one of the three engineering departments. The main portion of the building has offices, classrooms, and other general facilities including a library of some 35,000 volumes and 450 periodicals; an auditorium where audio-visual instruction can be given to large groups; conference rooms and seminar rooms; a student lounge; design rooms; facilities for reproducing copy of various types; a central precision shop; and central, as well as departmental, analog computation facilities.



Programs of Study and Requirements for Degrees

The College offers fully-accredited curricula leading to the degree of Bachelor of Science in Engineering (B.S.E.), with majors in civil, electrical, or mechanical engineering and in selected interdisciplinary areas. Through the Graduate School of Arts and Sciences it also offers work leading to the degree of Master of Science (M.S.) in civil, electrical, or mechanical engineering, and to the degree of Doctor of Philosophy (Ph.D.) in civil or electrical engineering.

Undergraduate Degree Offered

Bachelor of Science in Engineering

Beginning with the entering class in September, 1965, the College offers a four-year program leading to the degree of Bachelor of Science in Engineering (B.S.E.), with opportunity for majors in the professional fields of civil, electrical, or mechanical engineering, as well as for programs in interdisciplinary fields such as bioengineering, engineering mechanics, energy conversion, materials, and systems and controls.

For graduation with a bachelor's degree in engineering, a minimum of

134 semester hours* of course work must be completed including the following:

English. 6 s.h. This requirement is met by the completion of English 1-2.

Mathematics. 15 s.h. This requirement is met by completion of Mathematics 21, 22, 63, 64, and 111.

Natural Science. 16 s.h. This requirement is met by completion of Chemistry 1 and 2 and Physics 41 and 42.

Social Sciences and History. 6 s.h. This requirement may be satisfied by one of the following 6-hour sequences: Economics 1-2, or 51-52; History 1-2, or 51-52; Political Science 11-12 or 61-62; Psychology 91, to be followed by either Psychology 100 or 101; Sociology 91-92, or 93-94.

Humanities. 6 s.h. This requirement may be satisfied by 6 hours from the following: English 55-56, 57-58; Greek 121, 122; Latin 111, 112; all foreign language literature courses above 100 not given in translation; Philosophy 41-42, 93-94; Art 1-2, 51-52; Music 1-2, 51-52; Religion 1-2 or 51-52, 55, courses numbered 60-99.

Elective. 3 s.h. To be selected in consultation with adviser. Normally taken in freshman year.

Electives in Social Science, History, and Humanities. 6 s.h. In addition to the above, the student must elect a minimum of 6 semester hours of courses in social sciences, history, or humanities.

Physical Education. 4 s.h. Physical education is required during each of the first two years and is normally completed by the end of the sophomore year.

Departmental or Major Specifications. 37 s.h. In addition to the above requirements, 37 hours of courses in the third and fourth year are specified by the department in which the student is registered. A minimum of 16 hours of the 37 must be engineering courses of which 6 hours must be design-oriented studies.

Engineering Core Courses. 35 s.h. The normal engineering program includes 35 hours of engineering core courses and is met by completion of Engineering 1, 2, 23, 53, 63, 73, 83, 101, 113, 123, 133, 143, 163. Under special circumstances, a minimum of 10 hours of the normally required 16 hours of common-core engineering courses from the third- and fourth-year programs may be approved.

To provide the engineering student with the necessary background in

*A maximum of 6 hours of junior or senior level Air Science or Naval Science course work may be counted in satisfying the minimum requirements of 134 hours for a baccalaureate degree in engineering. These 6 hours may not be substituted for any of the above requirements in English, Social Sciences and History, Humanities, or electives in Social Sciences, History, and Humanities. All other credits earned in Air Science or Naval Science are taken in addition to the minimum program.

fundamentals upon which a variety of engineering programs of study can be based, and to relieve him of the necessity of committing himself immediately to a specific major branch of engineering, a common core of courses is provided for the freshman, sophomore, and part of the junior years.

Common-Core Program of Studies for the Degree of Bachelor of Science in Engineering

Freshman Year

First Semester

	<i>s.h.</i>
Chem 1—Gen. Inorg. Chemistry .	4
Engrg 1—Engineering Design I .	2
Approved elective	3
Engl 1—English Composition ..	3
Math 21—Intro. Calculus	3
PE—Physical Education	1
	16

Second Semester

	<i>s.h.</i>
Chem 2—Gen. Inorg. Chemistry .	4
Engrg 2—Engrg. Design II	2
Engrg 23—Statics	3
Engl 2—English Composition ...	3
Math 22—Intro. Calculus	3
PE—Physical Education	1
	*16

Sophomore Year

First Semester

	<i>s.h.</i>
†Engrg 73—Mechanics of Deformable Bodies	3
†Engrg 83—Structure & Properties of Solids	3
Humanities—Social Studies Elective	3
Math 63—Intermed. Calculus .	3
Phys 41—General Physics	4
PE—Physical Education	1
	17

Second Semester

	<i>s.h.</i>
†Engrg 53—Engrg Design III .	2
†Engrg 63—Introductory Electric Systems I	4
Humanities—Social Studies Elective	3
Math 64—Intermed. Calculus .	3
Phys 42—General Physics	4
PE—Physical Education	1
	17

*Freshman engineering students taking Air Science or Naval Science should schedule certain courses in addition to the 16 semester hours prescribed.

†The combination of Engrg 73 and 83 is interchangeable with the combination of Engrg 53 and 63.



Junior Year

First Semester	s.h.	Second Semester	s.h.
Humanistic-Social Studies		Humanistic-Social Studies	
Elective	3	Elective	3
*Engrg 113—Introductory Elec-		*Engrg 123—Dynamics	3
tric Systems II	3	*Engrg 143—Fluid Mechanics .	2
*Engrg 133—Heat Transfer ...	2	†Engrg 163—Fields	3 or 0
Engrg 101—Thermodynamics .	3	* [*] Departmentally Specified	
Math 111—Appl. Math		Courses	6 or 9
Analysis I	3		17
^{**} Departmentally Specified			
Course	3		
	17		

Senior Year

(See departmental programs: pages 10, 14, or 17.)

*Engrg 113 and Engrg 123 are interchangeable; Engrg 133 and Engrg 143 are interchangeable.

†May be scheduled in semester 6, 7, 8, or 9. (A small group of students will be invited to enroll in an experimental section of a course involving an integrated approach to the topics of fields, heat transfer, and/or fluids.)

^{**}To be taken from approved programs in professional fields of civil, electrical, or mechanical engineering. Work may also be arranged in interdisciplinary fields such as bioengineering, engineering mechanics, energy conversion, materials, systems and controls.

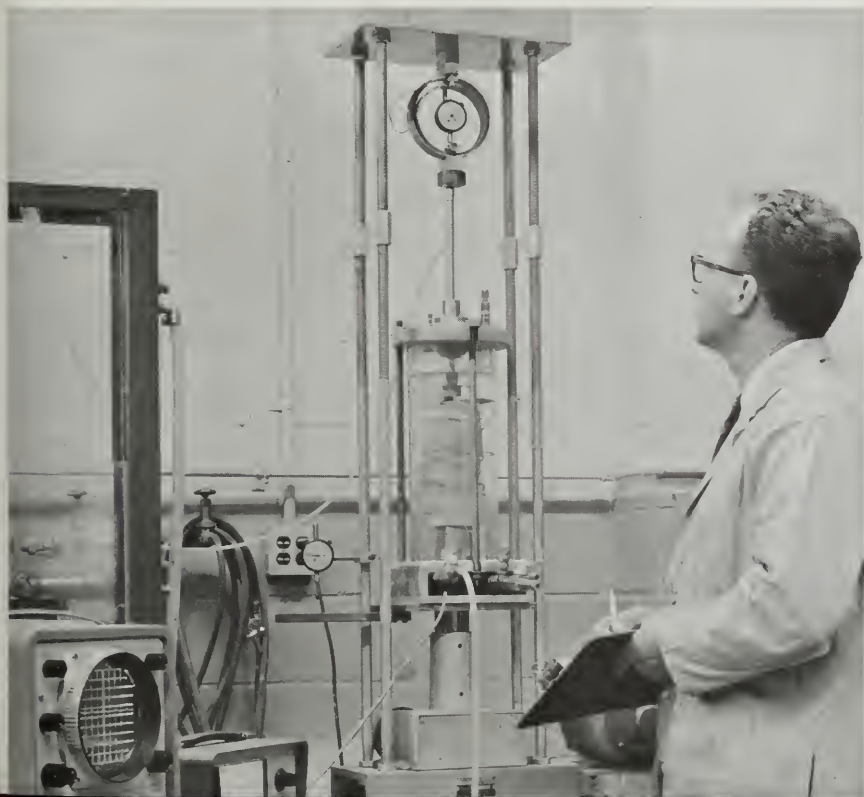


Department of Civil Engineering

Although the scope of the civil engineering profession is very broad, its work may be classified into five major fields: *hydraulics*—flood control, river and harbor improvements, irrigation, drainage, and water power; *land utilization*—development of communities, industrial sites, and existing cities; *sanitary engineering*—public health, water supply, and waste disposal; *structures*—bridges, buildings, foundations, dams, tunnels, tanks, thin shells, and missile structures; *transportation*—railroads, highways, airports, waterways, pipelines, and traffic control.

The concern of the civil engineer is primarily with conception, design, and construction, although his responsibility often includes management and maintenance. His undergraduate education comprises scientific, technical, civic, and cultural subjects. In order that he may become qualified to assume responsible charge of engineering work, he must supplement this instruction with progressive study after he graduates and while he is securing his practical experience.

The *Mechanics of Materials Laboratory* is equipped to give instruction in the basic principles of stress and strain and for the testing of structural members. Its facilities are adequate for both graduate and undergraduate instruction. Included in this laboratory are three universal testing machines with capacities from 5,000 to 400,000 pounds; various hardness testers; machines for testing torsion, fatigue, and impact; calibration ap-



paratus; and a variety of modern strain gages of direct acting mechanical and electric-resistance types.

The *Materials Laboratory* has the equipment necessary for both research and instruction in the physical properties and stress-deformation characteristics of bituminous mixtures, concretes, and soils.

For advanced instruction in *Stress Analysis* there are various polariscopes with facilities for taking and developing pictures, large-sized Begg's deformeter, loading frames, and miscellaneous tools for preparing accurate models for testing. Modern electrical and mechanical instrumentation is available for strain measurements.

The department has an unusually modern and representative collection of *Surveying Equipment*: transits, levels, plane tables, accessory equipment, precise levels and theodolites.

The *Sanitary Engineering Laboratory* is equipped for instruction and research in the characterization of waters and wastewaters, and in the application of biological, chemical and physical measurements to the solution of technical problems relating to environmental health.

For *Digital Computer Programming*, departmental card punch equipment using the ALGOL and FORTRAN languages is available.

Program of Study in Civil Engineering for the Bachelor of Science in Engineering Degree

This program became effective with the class that entered in Sept., 1965.

For uniform *freshman* and *sophomore* program see page 7.

Junior Year

<i>First Semester</i>		<i>Second Semester</i>	
	<i>s.h.</i>		<i>s.h.</i>
Δ °Humanistic-Social Studies		Δ °Humanistic-Social Studies	
Elective	3	Elective	3
°Engrg 113 Introductory		°Engrg 101 Thermodynamics .	3
Electric Systems II	3	°Engrg 133 Heat Transfer ...	2
°Engrg 123 Dynamics	3	CE 96 Measurements	3
°Engrg 143 Fluid Mechanics .	2	CE 123 Hydraulic Engrg	3
°Math 111 Applied Math		Δ Approved Elective	3
Anal. I	3		17
CE 131 Structural Mech. I ..	3		
	17		

ΔPart of a program of electives planned with departmental approval to suit the interests and abilities of the individual student. The program will include a minimum of 6 semester hours of either economics or political science. The program will also include a minimum of 9 semester hours in mathematics, the natural sciences, or other technical subjects; English 93 will normally be part of these 9 semester hours.

°Common-Core Courses.

Senior Year

First Semester

	<i>s.h.</i>
Δ ° Humanistic-Social Studies	
Elective	3
CE 118 Materials	2
CE 124 Sanitary Engrg.	3
CE 133 Structural Design I ..	3
CE 139 Soil Mechanics	3
Δ Approved Elective	3
	<u>17</u>

Second Semester

	<i>s.h.</i>
Δ ° Humanistic-Social Studies	
Elective	3
CE 116 Transportation	3
CE 134 Struct. Design II	3
CE 150 Engrg. Systems	2
† Engrg 163 Fields	3
Δ Approved Elective	3
	<u>17</u>

Under special circumstances, a minimum of 22 semester hours of the normally required 28 semester hours of Civil Engineering courses may be approved by the Director of Undergraduate Studies.

First Graduate Year

The Master of Science program is planned as the fifth year of a five-year sequence of studies. Admission to the Master's program follows completion of the requirements for the Bachelor of Science in Engineering degree (at Duke University), or its equivalent (from another institution), and is contingent upon admission to the Graduate School of Arts and Sciences.

First Semester

	<i>s.h.</i>
CE 200- or 300-level course ..	3
CE 200- or 300-level course ..	3
**Minor Course	3
Approved elective course ...	3
Thesis research	3
	<u>15</u>

Second Semester

	<i>s.h.</i>
CE 200- or 300-level course ..	3
CE 200- or 300-level course ..	3
**Minor Course	3
Approved elective course ...	3
Thesis research	3
	<u>15</u>

Subsequent Graduate Study

For further information concerning work leading to the M.S. degree, as well as that leading to the Ph.D. degree, refer to the sections of this Bulletin, beginning on pages 51 and 68.

Δ Part of a program of electives planned with departmental approval to suit the interests and abilities of the individual student. The program will include a minimum of 6 semester hours of either economics or political science. The program will also include a minimum of 9 semester hours in mathematics, the natural sciences, or other technical subjects; English 93 will normally be part of these 9 semester hours.

° Common-Core Courses.

† Engrg 163 may be delayed to the first semester of the fifth year.

** Normally Mathematics or Natural Science.

Department of Electrical Engineering

Electrical Engineering utilizes the electrical and magnetic forces of nature and properties of matter to supply human needs. To an increasing degree its products and services influence the daily living of most of the world's population. It is concerned with the *processing and transmitting of information*—as in radar, television, radio and wire telephony, measurement, electronics, computation, and control. It is equally concerned with the *processing, transmitting, and controlling of energy*—as in solid state converters, magnetohydrodynamic generators, nuclear reactors, rotating machines, power systems, and automatic industrial processes. It provides most of our labor-saving home appliances and many of the instruments of modern scientific research and of modern medical practice.

The professional electrical engineer may engage in consulting, teaching, research, development, design, manufacturing, operation, maintenance, management and sales. His education must therefore provide a fundamental understanding of both the science of electrical engineering, which is based on mathematics and the physical sciences, and the art of electrical engineering, which depends on human imagination and judgment. It must also prepare him to serve as a responsible member of society by providing him with an appreciation of the humanities and the social sciences.

The program in electrical engineering at Duke, therefore, does not stress the mere acquisition of specific skills and methods, but seeks, in both classroom and laboratory, to stimulate students to think creatively in terms of fundamental concepts. It is hoped that, once started, creativity may become a habit.

Such a program requires an able staff, extensive library resources, and well-equipped laboratories, such as are found here. Some idea of the range of interests in electrical engineering which are included in this program may be conveyed by a brief survey of the laboratory activities of the Department.

In the *Fields and Circuits Laboratory* the configurations of two- and three-dimensional fields are studied by several different analog techniques. Complex network functions are studied by means of an electrolytic tank mapper. Nonsinusoidal waves are synthesized and analyzed, and oscillographic studies are made of both steady-state and transient behavior of direct-current circuits and single-phase and polyphase alternating-current circuits.

The *Solid-State Materials Laboratory* is well-equipped for both instructional and research projects in which the macroscopic properties of materials, as exploited in devices, are studied at the microscopic and molecular levels. An X-ray diffraction diffractometer, a 9½-inch magnet, a

spin-echo spectrometer, a vacuum deposition system, and metallurgical and stereoscopic microscopes are utilized in this work.

In the *Ferromagnetics Laboratory* investigations are being conducted into such properties of ferromagnetic materials as magneto-thermal, magneto-optical, magneto-resistive and magneto-strictive effects.

Research in the *Superconducting Circuits and Thin-Films Laboratory* is directed toward exploiting for engineering application some of the unique physical phenomena which are observed to obtain at temperatures in the vicinity of absolute zero. Related thin-film research is in progress. A major facility of this laboratory is an electron microscope providing a resolution of $7\text{\AA}$.

The *Electronics Laboratories* are equipped for the study of the physical behavior of basic electronic components and of advanced electronic devices throughout the sub-radio frequency region.

In the *Radio-Frequency Laboratory* studies are made of radio-frequency systems and their component parts throughout the radio-frequency spectrum. Applications to television and radar are shown.

In the *Energy Conversion Laboratory* the principles of generation, transformation, and control of energy are studied as they are applicable to large-scale power systems and small self-contained systems. Thermo-electric generators, photovoltaic sources, transformers, a-c and d-c motors and generators, and their associated controls are included in this work.

In the *Automatic Control Systems Laboratory* studies are made of the principles underlying the fields of instrumentation and automatic control. Modern, high-performance equipment is available for synthesizing control systems and for determining control system performance.

The *Computer Laboratory* contains two general-purpose electronic analog computers. These devices are used in solving higher-order differential equations that are descriptive of the dynamic behavior of complex physical systems. A card-punch machine is available for use in programming problems for solution on the digital computer at the University Digital Computer Laboratory.

In the work of the *Spacecraft Systems Laboratory* principles from all phases of electrical engineering are brought to bear upon problems encountered in modern spacecraft technology.

In the *Spacecraft Telemetry Systems Laboratory* research centers on crosscorrelation techniques for the recovery of information contained in noisy signals received from scientific satellites and space probes.

Through *Amateur Radio Station W4AHY*, which is licensed to operate on the popular amateur bands using both voice and code transmission, interested engineering students who hold licenses may gain practical experience in short-wave radio.

Program of Study in Electrical Engineering for the Bachelor of Science in Engineering Degree

This program became effective with the class that entered in September, 1965.

For uniform *freshman* and *sophomore* program see page 7.

Junior Year

<i>First Semester</i>		<i>Second Semester</i>	
	<i>s.h.</i>		<i>s.h.</i>
Δ °Humanistic-Social Studies		Δ °Humanistic-Social Studies	
Elective	3	Elective	3
°Engrg 113 Introd. Electric Systems II	3	°Engrg 101 Thermodynamics .	3
°Engrg 123 Dynamics	3	°Engrg 133 Heat Transfer . . .	2
°Engrg 143 Fluid Mechanics .	2	°Engrg 163 Fields	3
°Math 111 Appl. Math Anal. I	3	Math Elective beyond Math 111	3
Phys 161 Modern Physics . . .	3	EE 161 Electronics and Signals	3
	<u>17</u>		<u>17</u>

Senior Year

<i>First Semester</i>		<i>Second Semester</i>	
	<i>s.h.</i>		<i>s.h.</i>
Δ °Humanistic-Social Studies		Δ °Humanistic-Social Studies	
Elective	3	Elective	3
EE 162 Electromechanical Energy Conversion	2	EE 167 Design Colloquium .	2
EE 163 Physical Electronics .	3	Δ EE Elective	3
EE 164 Electromagnetic Fields and Waves	3	Δ Approved Elective	3
Δ Approved Elective	3	Δ Approved Elective	3
Δ Approved Elective	3	Δ Approved Elective	3
	<u>17</u>		<u>17</u>

First Graduate Year

The Master of Science program is planned as the fifth year of a five-year sequence of studies. Admission to the Master's program follows completion of the requirements for the Bachelor of Science in Engineering degree (at Duke University), or its equivalent (from another institution),

Δ Part of a planned program of electives to be chosen in consultation with the Advisor.

°Common-Core Courses.

and is contingent upon admission to the Graduate School of Arts and Sciences.

<i>First Semester</i>		<i>Second Semester</i>	
	<i>s.h.</i>		<i>s.h.</i>
EE200- or 300-level course ...	3	EE200- or 300-level course ...	3
EE200- or 300-level course ...	3	EE200- or 300-level course ...	3
†Minor course	3	†Minor course	3
Approved elective course	3	Approved elective course	3
Thesis research	3	Thesis research	3
	<u>15</u>		<u>15</u>

Subsequent Graduate Study

For further information concerning work leading to the M.S. degree, as well as that leading to the Ph.D. degree, refer to the sections of this Bulletin, beginning on pages 51 and 73.

Department of Mechanical Engineering

The Mechanical Engineer is concerned with the design and construction of equipment to convert energy from natural sources into useful work and to utilize energy effectively to process goods. He is also concerned with the organization of men and machines for the manufacture of products. To fulfill these functions, the mechanical engineer must possess a thorough knowledge of the basic sciences and be adept in using this knowledge to find optimum solutions to the problems with which he is confronted. In general, he would pursue a career in one of the following comprehensive fields: (1) research, development and design; (2) production, manufacturing and operation; and (3) management.

The mechanical engineering curriculum at Duke University provides a balance between basic sciences, mathematics, engineering sciences, social sciences, humanities and professional engineering courses. Flexibility is provided in the form of electives by which the student may emphasize particular goals of his own choosing. The elective programs may be chosen to provide a strong minor in mathematics, the physical sciences, economics, or the humanities. Outstanding students may elect in their senior year projects which test and develop their ability to do research work.

Digital computer programming is introduced at the freshman level and is used in regular course work throughout the remaining years. Programs are prepared by students and are processed on the large-scale computer in the adjacent Mathematics-Physics Building.

†Normally Mathematics or Natural Science.

The department has several small *analog computers*, and participates in the central facility of the College.

The laboratories provide facilities both for undergraduate instruction and for graduate level research in each of the major fields of mechanical engineering. Instrumentation includes many cathode-ray oscilloscopes, analog computers, strain-gage bridges, hot-wire anemometers, recording oscillographs, and photographic equipment.

A modern, well-equipped *materials laboratory* is available for examining the structures of materials and relating these to the properties of the materials and to the methods of processing. Polymers and ceramics, as well as naturally-occurring materials, may be prepared and examined with the facilities available. In addition, testing equipment and furnaces are provided for determining the effects on properties of changes induced by heat treatment.

Basic *thermodynamic experiments* are performed on such apparatus as a large single-stage air compressor, steam turbines, heat exchangers, experimental refrigeration equipment and *internal combustion engines*, including Diesel and automotive engines. A CFR variable compression-ratio engine, in a separate laboratory with complete control and testing equipment, is available for further investigations. Indicator diagrams can be obtained either through electronic strain-gages or with purely mechanical devices.

Heat flow problems are studied by determining temperature distributions on actual equipment. The results are compared with those obtained from analog water tanks, digital computer calculations, and an electric analog system.

The *flow of fluids* is studied on a water table equipped for shock wave investigations and on supersonic flow apparatus, as well as with an assortment of the fans, nozzles, and pumps commonly found in such laboratories.

The behavior of *mechanical systems* is an area of rapidly growing importance in mechanical engineering. Several simple systems have been built for undergraduate study of vibratory and basic feedback control phenomena, while more elaborate systems are used for advanced study. Auxiliary equipment available includes vibration tables and shakers and a shock stand as well as pickups of several varieties, amplifiers, recorders and the analog computers.

Shop facilities are available to support student as well as faculty projects and for special instruction.

Program of Study in Mechanical Engineering for the Bachelor of Science in Engineering Degree

This program became effective with the class that entered in September, 1965.

For uniform *freshman* and *sophomore* program see page 7.

Junior Year

First Semester

	<i>s.h.</i>
Δ *Humanistic-Social Elective	3
*Engrg 123 Dynamics	3
*Engrg 101 Thermodynamics	3
*Engrg 143 Fluid Mechanics	2
*Math 111 Applied Math.	
Anal. I	3
ME 133 Mechan. Design I	3
	<u>17</u>

Second Semester

	<i>s.h.</i>
Δ *Humanistic-Social Elective	3
*Engrg 113 Introductory Elec- tric Systems II	3
*Engrg 133 Heat Transfer	2
Math Elective Beyond Math 111	3
ME 102 Thermo II	3
Phys 161 Modern Physics	3
	<u>17</u>

Senior Year

First Semester

	<i>s.h.</i>
Δ *Humanistic-Social Studies Elective	3
ME 134 Mechanical Design II	2
ME 136 Response of Systems	3
ME Elective	6
Δ Approved Elective	3
	<u>17</u>

Second Semester

	<i>s.h.</i>
Δ *Humanistic-Social Studies Elective	3
ME 161 Mech. Engrg. Lab.	2
ME Design Elective	6
ME Elective	6
Δ Approved Elective	3
	<u>17</u>

First Graduate Year

The Master of Science program is planned as the fifth year of a five-year sequence of studies. Admission to the Master's program follows completion of the requirements for the Bachelor of Science in Engineering degree (at Duke University), or its equivalent (from another institution), and is contingent upon admission to the Graduate School of Arts and Sciences.

First Semester

	<i>s.h.</i>
ME 200- or 300-level course	3
ME 200- or 300-level course	3
†Minor course	3
Approved elective course	3
Thesis research	3
	<u>15</u>

Second Semester

	<i>s.h.</i>
ME 200- or 300-level course	3
ME 200- or 300-level course	3
†Minor course	3
Approved elective course	3
Thesis research	3
	<u>15</u>

ΔPart of a planned program of electives to be chosen in consultation with the Advisor.

*Common-Core Courses.

†Normally Mathematics or Natural Science.

Interdisciplinary Major

This major would parallel the majors in civil, electrical, and mechanical engineering and, subject to faculty approval, would be offered in areas such as bioengineering, engineering mechanics, energy conversion, materials, and systems and controls.

The following requirements would govern the interdisciplinary major:

1. The program shall meet the requirements of the Bachelor of Science in Engineering degree as outlined on pp. 5-10, 14, 15, and shall in addition contain the requirements:
 - (a) A minimum of 16 s.h. of engineering course work in addition to common-core courses must be taken in the third and fourth years, of which 6 s.h. must be design-oriented studies.
 - (b) Limitation shall be placed on the amount of work which can be taken in a given department during the third and fourth years so that the advantages of interdisciplinary studies may be realized.
2. Each student enrolled in an approved interdisciplinary program shall be assigned to an appropriate engineering department for administrative purposes.

Graduate Degrees Offered

Through the Graduate School of Arts and Sciences the College of Engineering offers work leading to the degree of Master of Science (M.S.) with a major in civil, electrical, or mechanical engineering, and to the Doctor of Philosophy (Ph.D.) degree with a major in civil or electrical engineering.

Master of Science and Doctor of Philosophy Degrees with a Major in Engineering

The graduate programs in engineering are designed to provide a fundamental understanding of the science of engineering, which is based on mathematics and the physical sciences, as well as a basic understanding of the art of engineering, which depends on human imagination and judgment. Each engineering graduate student consolidates his understanding through participation in seminars appropriate to his field of study.

A *minimum* of 30 units of earned graduate credit beyond the Bachelor's degree is required for the M.S. degree: 12 in engineering, 6 in related minor work (normally mathematics or natural science), 6 in either the major or minor subject or in other areas approved by the major depart-

ment and the Dean of the College of Engineering, and 6 for a research-based thesis. There is no language requirement for this degree.

A *minimum* of 60 units of earned graduate credit beyond the Bachelor's degree is required for the Ph.D. degree: 24 in engineering, 12 in related minor work (normally mathematics or natural science), 12 in either the major or minor subject or other areas aproved by the major department and the Dean of the College of Engineering, and 12 for a research-based dissertation. In addition, a reading knowledge of two foreign languages which are relevant to the field of the dissertation is required (normally two of the following: French, German, or Russian).

Programs of Study in Civil Engineering for the Degrees of Master of Science and Doctor of Philosophy

A student may specialize in one of the following fields of study for either the M.S. or the Ph.D. degree with a major in Civil Engineering: engineering mechanics, hydraulic engineering, materials science, sanitary engineering, soil and foundation engineering, or structural engineering. Appropriate combinations of these fields are also encouraged.

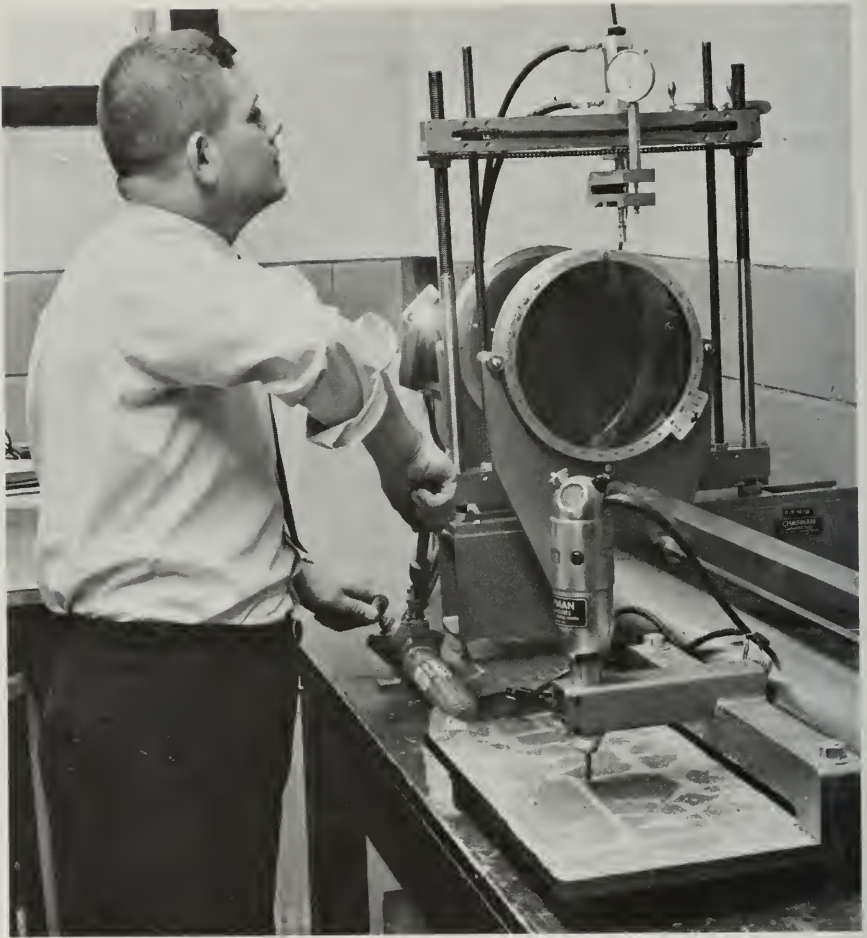
Under the Reciprocal Agreement with the Consolidated University of North Carolina a student may include, as a portion of the minimum requirements, work offered by the Department of Environmental Sciences and Engineering of the University of North Carolina. Although minor work normally is taken in the natural sciences or mathematics, a student whose major interest relates to the social sciences may take relevant minor work in this area.

A minimum prerequisite to the graduate program in civil engineering is a basic knowledge of mathematics through linear differential equations, materials science, solid mechanics, and fluid mechanics.

Programs of Study in Electrical Engineering for the Degrees of Master of Science and Doctor of Philosophy

A student may specialize in any one of the following fields in working toward either the M.S. or the Ph.D. degree with a major in Electrical Engineering: solid-state materials and devices; ferromagnetics; superconducting circuits; instrumentation; electronics; microwaves; computers and automatic control; energy conversion; information processing; and biomedical engineering.

A minimum prerequisite to the graduate courses in electrical engineering is a basic knowledge of differential equations, electric and magnetic field theory, and the theory of networks. A previous course in modern physics is recommended.



Program of Study in Mechanical Engineering for the Degree of Master of Science

Specialization in the following areas of study is available to students seeking the M.S. degree with a major in Mechanical Engineering: materials science; compressible and incompressible fluids; engineering mechanics; vibrations; heat transfer; and instrumentation. Emphasis is placed on the application of fundamental concepts of basic science and engineering science to mechanical design and analysis.

A minimum prerequisite to the graduate courses in mechanical engineering is a basic knowledge of differential equations, undergraduate thermodynamic theory, mechanics, and machine design.

Undergraduate Special and Cooperative Programs

Reserve Officers Training Corps

Through the Naval and Air Force Reserve Officers Training programs the University is cooperating with the Department of Defense in providing well-educated officers for the active and reserve forces of the nation.

The Naval Reserve Officers Training Corps

There are two basic programs through which students can qualify for Naval commissions upon graduation: one, the Regular Naval Reserve Officers Training Corps program, provides a maximum of four years in the University largely at government expense, followed by a commission in the regular Navy or Marine Corps; the other, the Contract program, leads to a commission in the Naval Reserve or the U. S. Marine Corps Reserve. Additional information may be found in the *Bulletin of Undergraduate Instruction*.

The Air Force Reserve Officers Training Corps

The unit functions as a regular department of instruction known as

the Department of Air Force Aerospace Studies. It selects, trains, and commissions college men who possess the requisite character, intelligence, desire, and sense of duty to become Air Force officers. Additional information may be found in the *Bulletin of Undergraduate Instruction*.

Advanced Placement Program

The colleges have arranged for course placement on the basis of good performance on either the Advanced Placement Examinations of the CEEB or—to a more limited extent—on placement tests given by Duke during Freshman Week. The College Board Advanced Placement Examinations are a vehicle to courses on the sophomore level or higher placement in botany, chemistry, English, French, German, history, Latin, mathematics, physics, Spanish, and zoology, whereas the Duke tests are used to decide such placement only in foreign languages and mathematics. A further distinction is that only the AP Examinations may lead to credit toward graduation for the course or courses omitted. The departmental directors of undergraduate study and the University Registrar are charged with the responsibility for evaluations leading to advanced placement of freshman matriculants.

Advanced Placement Examinations are given in May by the College Entrance Examination Board. Information regarding the tests may be obtained from the Board.

Study Abroad

A student contemplating study abroad should be guided by the provisions established by the Undergraduate Faculty Council and administered by the Committee on Study Abroad. For details, see *Bulletin of Undergraduate Instruction*.

Summer Study Abroad

Duke University, in cooperation with the Experiment in International Living, runs a summer program of study abroad in France, Germany, and Spain, open to all qualified Duke students. The program offers the opportunity to earn six to eight hours of academic credit. Participants are selected by the Committee on Study Abroad and the Experiment in International Living. Applications must be submitted before February 15 to qualify for the following summer group.

Eligibility for Special Curricular Programs

Reading-out of Introductory Courses

The option to “read” in order to by-pass introductory or pre-requisite courses is open to students of demonstrated academic ability to allow them to advance at their own pace to upper-level work. This opportunity ensures a richer program for the student who has few places in his curriculum for electives. Any student interested in reading during the summer to by-pass an introductory or pre-requisite course must be recommended by his dean and secure the permission of the department concerned. Reading for a course and auditing are mutually exclusive procedures. A proposed program of reading should be approved by the director of undergraduate studies in the department in which the work will be done. On passing a three-hour qualifying examination prepared by the department a student may be certified for advanced course work in the area. On completion of an advanced course, an entry will be made on his permanent record that he has passed a qualifying examination but no course credit is awarded. Interested students should request further information from the Dean’s Office.

Independent Study

Students who have a 3.0 quality point ratio overall and in their major may be permitted to enroll for independent study during their junior and senior years. A student need not be in a Graduation with Distinction program to enroll in independent study courses. The maximum credit allowed for independent study and honors research courses is three semester hours per semester during the junior year and six semester hours per semester during the senior year. Interested students should consult the Director of Undergraduate Studies in the department in which they wish to work.

Graduation with Distinction

Programs featuring independent study and other honors opportunities are available under the title Graduation with Distinction in all three departments. Although the details and requirements of the program vary from department to department, certain general requirements are uniform. Each department participating invites, at the end of their junior year, those students who have maintained at least a “B” average in the major field and an over-all average of “B” to enter the Graduation with Distinction Program. After participation in a senior seminar, and/or a directed course of reading, laboratory research, or other independent study, the student must embody the results of his individual research and study in



a distinguished piece of writing. The paper is assessed by a departmental committee which, if it approves, recommends that the student be Graduated with Distinction in his major field. Interested students should consult the Director of Undergraduate Studies in the appropriate department.

Reciprocal Agreement with the Consolidated University of North Carolina

Under a plan of cooperation between the Consolidated University of North Carolina and Duke University, students regularly enrolled at Duke University during the regular academic year, and paying full fees to that institution, may be admitted to a maximum of two approved courses per semester at the Consolidated University upon payment of a nominal registration fee of two dollars and of any other special fees regularly required of all students.

Student Life

Living Accommodations

As the undergraduate colleges of the University are resident institutions, all students are required to live in the residence halls. Any exceptions must be approved by the Dean of Men or the Dean of Women. Rooms are not rented for a shorter period than one semester. No refund of room rent will be made except for involuntary withdrawal to enter the armed services. Such refunds are made in accordance with the University's established schedule. (See *Financial Information* for living expenses.)

Housing

Undergraduate Men. Upon their admission to the College of Engineering, men students are sent detailed information by the University Housing Bureau concerning their obligations under the housing contract. The houses in Kilgo and part of Crowell are reserved for members of the freshman classes. Each of these units has a resident Head Housemaster and one or more Housemasters. A limited number of Freshmen reside in other houses where they live in community with upperclass students and a Fellow, a Faculty member or an advanced graduate student who serves as their adviser.

Undergraduate Women. All residence houses of the Woman's Col-

lege have both single and double rooms. These houses are alike in their organization. In each of them there is a resident House Counselor, who is a member of the Dean's staff, and full representation from all four classes, with the appropriate number of places reserved each year for freshmen. Young women enrolled in Engineering also live on East Campus.

Graduate Housing. Duke University strives to provide comfortable, attractive living facilities for resident students both married and unmarried.

Men's Graduate Center is available to men enrolled on a full-time basis in the graduate or professional schools. The majority of rooms are occupied by two persons. A limited number of single rooms are available but are generally reserved by students who have been in residence the previous year.

Epworth Inn on the Woman's College Campus and a graduate section of Hanes Annex are available to women enrolled in the graduate and professional schools.

Duke University Apartments are available for full-time graduate and professional students. The 224 units are complete with basic furnishings.

For details concerning living accommodations, see the *Bulletin of Undergraduate Instruction* or the *Bulletin of the Graduate School of Arts and Sciences*.

Dining Facilities

The dining facilities on the West Campus include three cafeterias, with multiple-choice menus, and the Oak Room where full meals and *a la carte* items are served. The dining halls in which all resident women have their meals are located in the Woman's College Union and in Gilbert-Addoms residence hall. Because of the large number served in the dining halls, it is not possible to arrange special diets for individual students. The Men's Graduate Center has a cafeteria open at meal hours, and a coffee lounge open until 11:00 p.m.

Services Available

Medical Care

The Student Health Program is closely related to the Teaching Hospital of the Duke University Medical Center. This arrangement provides an unusually comprehensive service, available at all times. The cost, for regularly enrolled students, is included in the general fee paid each semester and in the fees charged each student in the summer quarter.

For details concerning medical care, see the *Bulletin of Undergraduate Instruction* or the *Bulletin of the Graduate School of Arts and Sciences*.

The Counseling Center

The University maintains a counseling center which provides educational, vocational, and personal counseling for students. The Center is the administrative agency for most of the national testing programs, including admissions tests for graduate and professional schools. A library of information on occupations, graduate training, and fellowships for graduate study is maintained.

The counseling and information services of the Center are free to Duke students. Additional information on the counseling, testing, and information services may be secured from the Duke University Counseling Center, 309 Flowers Building, Duke University, Durham, North Carolina, 27706.

Appointments Office

The appointments office is a service agency designed to aid students and alumni in obtaining both summer and post-college employment. Its primary function is to serve as an intermediary between students, alumni, and prospective employers. It directs attention to possibilities in business and professional fields, it assembles comprehensive records on each registrant and makes these records available to appropriate representatives, and it arranges interviews with prospective employers. The Office initiates contacts for students or cooperates with students who make contacts through personal efforts or through various departments of the University. It aids the registrant in directing his search to a field appropriate to his aptitude, training, and interest.

There are two major divisions of the Office: the Commercial Division, which handles all matters involving contacts with business and professional areas not related to formal education; and the Educational Division, which concerns itself with teaching and school administration positions at all levels. Seniors, graduate students, and alumni may register with either or both of these divisions.

The Office receives more calls for qualified personnel than it can supply from its registrants. It is to the mutual advantage of the students and the Office that a complete record of registrants be assembled by the fall of the senior year or, in the case of graduate students, by the fall preceding the year during which they will seek employment.

Organizations and Activities

Engineers' Student Council

The Engineers' Student Council, composed of approximately 14

members from the various organizations and classes in the engineering student body, coordinates the activities of all student organizations in the College. The Council acts to represent the interests of the students in their relationships with the public, the faculty, and the administration. The Council is responsible for such activities as the Engineers Show, homecoming displays, supervision of the student Lounge, social events, and the Engineers Guidance Council.

Engineering Student Publication

The DukEngineer, official student-published magazine of the College, which appears twice each semester, contains articles on technical and semi-technical topics and other matters of interest in the College.

Engineers' Radio Association

Membership in the Engineers' Radio Association is open to all students of the College who have an interest in amateur radio. The Association operates amateur radio station W4AHY and conducts code and theory classes for members who desire to obtain a Federal Communications Commission license.

General Activities Open to Engineers

As part of the University Community, students in the engineering programs share in all activities open to students.

Student Branches of Engineering Professional Societies

The three Departments of the College support student branches of the following national professional engineering societies: *American Society of Civil Engineers*, *American Society of Mechanical Engineers*, *Institute of Electrical and Electronics Engineers*.

Engineering Guest Lecture Series

In addition to his participation in the student branches of the national professional engineering societies, the student has the opportunity of additional development through the *Engineering Guest Lecture Series*. The general function of the series is to provide stimulating lectures by outstanding members of the engineering profession.

Engineering Honor Societies

Tau Beta Pi. Engineering national honor society—Gamma Chapter of North Carolina.

Chi Epsilon. Civil engineering national honor society—Duke University Chapter.

Eta Kappa Nu. Electrical engineering national honor society—Delta Lambda Chapter.

Pi Tau Sigma. Mechanical engineering national honor society—Pi Iota Chapter.

Order of St. Patrick. Honor society recognizing leadership in engineering student activities.

General Honor Societies

In addition to the national engineering student honor societies, students of the College are eligible for membership in the national and local honor societies throughout the campus.

Engineering Awards and Prizes

The Tau Beta Pi Prize is a prize such as an engineering handbook which the North Carolina Gamma Chapter of Tau Beta Pi, engineering national honor society, awards each year to a sophomore student in engineering for outstanding scholastic achievement during the freshman year.

The American Society of Civil Engineers Prize consists of a Certificate of Award and a one year's payment of dues in the American Society of Civil Engineers. Awards are made annually by the North Carolina Chapter to the two outstanding seniors in civil engineering based on the recommendation of the faculty of the Civil Engineering Department. The basis for selection is the student's scholastic record, his contribution to the Student Chapter, and his participation in other college activities and organizations.

The American Public Works Association Prize consists of a Certificate of Award, one year's payment of dues in the American Public Works Association, and a \$25 cash award made annually by the North Carolina Section to an outstanding senior in Civil Engineering based upon the recommendation of the faculty of the Civil Engineering Department. The basis of selection is the student's scholastic record and his interest in a career in public works.

The George Sherrerd III Memorial Award in Electrical Engineering was established in 1958 by the parents of George Sherrerd III, a graduate of the class of 1955, to recognize outstanding undergraduate scholarship. This award, consisting of the income from a fund of \$5000.00, is made annually to that senior student in Electrical Engineering who, in the opinion of the Electrical Engineering faculty, has attained the highest level scholastic achievement in all subjects and simultaneously has

rendered significant service to the College of Engineering and the University at large. The recipient's name is inscribed on a plaque displayed in the Engineering Building.

The Charles Ernest Seager Memorial Award, established in 1958 by the widow and friends of Charles Ernest Seager, a graduate of the class of 1955, recognizes outstanding achievement in the annual Student Prize Paper Contest of the Duke Branch of the Institute of Electrical and Electronics Engineers. The award consists of inscribing the name of the contest winner on a plaque displayed in the Engineering Building.

The Milmow Prize consists of a certificate of award and a one year's payment of dues in the Institute of Electrical and Electronics Engineers for the membership year in which the honoree is awarded his baccalaureate degree. It is awarded annually to that student from North or South Carolina graduating in the Department of Electrical Engineering who, in the opinion of the faculty of that department and as shown by his grades, has made the most progress in electrical engineering during his last year in college.

The T. C. Heyward Award is given annually to the outstanding Mechanical Engineering Sophomore by Pi Tau Sigma. The award will normally consist of a handbook as well as a small cash award.

The Walter J. Seeley Scholastic Excellence Award is presented annually by the Engineers Student Council, in the name of Dean Emeritus Walter J. Seeley, to that member of the graduating class of the College who has achieved the highest scholastic average in all subjects and who has shown diligence in the pursuit of an engineering education. The recipient of the award is determined by a committee composed of the chairmen of the respective departments, the Assistant Dean of the College of Engineering, and a representative of the Engineers Student Council. This award is initiated in the spirit of academic excellence and professional diligence demonstrated by Dean Seeley. The Council hopes that this award will serve as a symbol of the man and the ideals for which he stands.

Admission

Undergraduate

New students are admitted for the academic year at the opening of school in the fall.

Because enrollment is limited, the Committee on Admissions selects those students who in its judgment are best qualified to benefit from the opportunities which the College offers. Selection is based not only upon academic grades and test scores but also upon recommendations of school officials and other personal criteria.

Requirements

Although there are no inflexible subject matter requirements, at least 15 acceptable units of secondary school credit must be presented. Of these at least 12 must be in college preparatory subjects: English, foreign language, history and social studies, mathematics, and physical or biological sciences. Applicants for the College of Engineering are advised to present four units of mathematics and at least one unit in physics or chemistry.

Students applying for admission are required to take the Scholastic Aptitude Test, the English Composition test, and two other achievement tests of their own choosing given by the College Entrance Examination

Board. Candidates applying to the College of Engineering must include the appropriate mathematics test.

Prospective students are urged to broaden their reading outside of class during their senior year and to make the acquaintance of books and magazines that do not form part of the subject matter of their courses. At the same time, they should take every opportunity to increase their competence in writing. Those who cannot write simple, clear, grammatical English prose will be progressively at a serious disadvantage in the competition for admission and also in the general work of the freshman year. Careful attention to correctness in English in correspondence and on application blanks cannot be too seriously stressed for candidates for admission.

Regular Admission

Candidates for regular admission must apply no later than January 15, and normally do so during the fall of the senior year. For this group, decisions are mailed by April 15.

Application forms and instructions regarding procedure and necessary documents to be included will be sent upon request to the Office of Admissions, Duke University, Durham, North Carolina, 27706. A non-refundable processing fee of \$10.00 must accompany the submission of the full application form.

A candidate for admission who wishes to arrange an interview should do so through the Director of Undergraduate Admissions.

Early Decision Plan

For the well-qualified student who has definitely decided to enter Duke if accepted, the University offers to reserve a place by "early decision" on December 1 of the student's senior year in secondary school. The deadline date for completing applications for Early Decision is November 1. Interested students should write to the Office of Admissions for detailed information.

Admission to Advanced Standing

Admission by transfer from other institutions may be arranged for a limited number of students under certain well-defined regulations. All such candidates must submit official transcripts of all work completed at other colleges, accompanied by a statement of honorable dismissal and scores on the Scholastic Aptitude Test of the College Entrance Examination Board. An overall grade average of at least C must have been earned on work previously completed; courses on which a grade less than C has been earned cannot be accepted for transfer credit. Students may not apply for transfer beyond admission to the junior class. Further detailed

regulations for admission by transfer may be obtained from the Office of Admissions.

A small number of special students of mature age may be admitted for such courses of instruction as their earlier training and experience may qualify them to take. They may not be accepted, however, as candidates for a degree in a regular course unless they are able to meet all normal requirements for admission which apply to all beginning students.

Readmission of Former Students

A student who desires to return, following withdrawal from College, should apply to the Director of Undergraduate Admissions. He will be asked to send a detailed statement of his activities since withdrawal. If practicable, the student should arrange for an interview with the appropriate Dean of the College.

Graduate

Prerequisites

A student seeking admission to the Graduate School of Arts and Sciences of Duke University with a major in engineering must have received a Bachelor's degree from an accredited institution. His undergraduate program should be well rounded and of such quality as to give positive evidence of capacity for graduate study. Normally he should have majored in the area of his intended graduate study. The three Departments of Engineering list specific prerequisites in their respective sections of this Bulletin.

Students Requiring Admission

Admission is required of (1) all students who intend to pursue study toward a degree offered by the Graduate School, (2) all other students who desire credit for whatever purpose for graduate courses—except students who register as Special Students in the Summer Session. Students who have discontinued a program of study after earning a master's degree here must by letter request permission of the Dean of the Graduate School to undertake a doctoral program. Members of the Duke University faculty will be granted only Non-Degree Admission.

Procedure for all Applicants

A student seeking admission to the Graduate School should request the Dean of the Graduate School to send an application blank. This he should

fill out completely and return promptly. In addition he should provide the following supporting documents: (1) a transcript or transcripts of all his undergraduate and graduate work mailed directly by the Registrar to the Dean; (2) as soon as possible, supplementary transcripts showing completion of work in progress when the earlier transcript was made; (3) three letters of recommendation written by persons best qualified to judge him as a prospective graduate student and mailed directly to the Dean; and (4) scores on the Graduate Record Examination and Miller Analogies Test (recommended for all applicants and required of applicants for fellowships or traineeships).

All applicants except foreign students applying from outside the United States and non-degree students must include an application fee of \$5.00 in check or money order payable to Duke University.

Additional Procedure for Foreign Students. Fully qualified students from outside the United States are welcomed in the Graduate School to take courses and in many instances to study toward a degree. In addition to the information required of all students, the foreign student should submit with his application for admission certain special information, as outlined in the *Bulletin of the Graduate School of Arts and Sciences*.

Closing Dates for Applications

Because applications cannot be reviewed until all required supporting documents are filed, applications for admission to the Graduate School of Arts and Sciences should be submitted at least *two weeks* before the closing dates listed below:

Fall semester, admission and award	February 15
Fall semester, admission only	August 1
Spring semester, admission only	January 1
Summer Session,* First Term	May 13
Summer Session,* Second Term	June 21

Notification of Admission

When admission to the Graduate School is approved, the student will receive a letter of admission and an acceptance form. The process of admission is not complete until the statement of acceptance has been returned. (For a more complete discussion of admission status, refer to the *Bulletin of the Graduate School of Arts and Sciences*.)

*Students seeking admission to the Summer Session should make application to the Dean of the Graduate School as well as to the Director of the Summer Session.

Financial Information

Undergraduate Fees and Expenses

Fees paid by the students cover only a part of the cost of their instruction and of the operations of the University. Income from endowment and contributions from the alumni, alumnae, and other public-spirited men and women meet the balance, which constitutes more than half the total cost.

Estimated Expenses for an Academic Year

Certain basic expenditures are to be considered in preparing a student's budget, such as tuition, the general fee, room and board. The necessary expenditures together with a reasonable amount allotted for miscellaneous items such as laundry, organizational dues, and sundry purchases are shown as follows:

	Men	Women
Tuition	\$1,250.00	\$1,250.00
General Fee	187.00	187.00
Room Rent	310.00	335.00
Board	* 550.00	† 500.00
Books and Supplies	70.00	70.00
Miscellaneous Expenses	‡ 443.00	‡ 443.00
Totals	<u>\$2,810.00</u>	<u>\$2,785.00</u>

*Cafeteria estimate. †Board rate. ‡Moderate estimate.

Miscellaneous expenses beyond the moderate estimate given above depend to a large extent upon the tastes and habits of the individual. It is realistic to suggest that the average Duke student, however, can plan on a budget of \$2,800.00 for the academic year. Travel costs, clothing purchases, and other major expenditures would have to be added to this estimate.

Debts

No records are released and no student is considered by the faculty as a candidate for graduation until he has settled with the Bursar for all indebtedness.

Bills may be sent to parents or guardians provided the Bursar has been requested in writing to do so. Failure to pay bills on or before the due dates will debar the student from class attendance until the account is settled in full.

Tuition and Fees

Tuition and General Fee. The tuition of \$625.00 and the general fee of \$93.50 are due and payable not later than the day of registration for a particular semester. After the day of registration no refund of the tuition or the general fee will be made except for involuntary withdrawal to enter the armed services.

Registration Fees and Deposit. New students, on notification of acceptance, are required to pay a non-refundable first registration fee of \$20.00 and to make a deposit of \$50.00. The deposit will not be refunded to accepted applicants who fail to matriculate. For those who do matriculate, \$25.00 of the deposit serves as a continuing room deposit for successive semesters, and the remaining \$25.00 serves as a continuing registration deposit. Arrangements for refund of the \$25.00 room deposit are described in information furnished each resident student by the Housing Bureau.

Readmission. Students who have been readmitted to the University after an absence of one or more semesters, on notification of readmission, are required to make the \$50.00 room and registration deposit.

Late Registration. Students who register in either semester at a date later than that prescribed in the Calendar of the College must pay to the Bursar a fee of \$5.00.

Refunds. The \$25.00 pre-registration deposit will be refunded to students (1) whom the University does not permit to return, (2) who graduate, or (3) who request the refund at the time of pre-registration, thus indicating their intention not to return for the following semester. The pre-registration deposit will not be refunded to students who pre-register and fail to enter the following semester on schedule.

ROTC Deposit. An Air Force ROTC deposit of \$20.00 is required of students enrolling in Air Science to cover possible loss of military equipment issued to them. This deposit is refunded to the student upon return of issued equipment.

Fees for Special Students. In the regular academic year students who register for no more than two courses with a maximum credit of eight semester hours are classified as special students. They are charged a registration fee of \$5.00 for each course and \$42.00 for each semester hour of course credit. Registration for nine or more semester hours, or three or more courses, requires payment of full fees.

Fees for Auditing. Auditing of one or more courses without charge is allowed students paying full fees, provided that the consent of the instructor is obtained. Students who are enrolled for not less than three nor more than eight semester hours may audit other courses by payment of \$21.00 for each course audited.

Fees for Duke Employees. In order to encourage its employees in their professional and personal advancement, Duke University will permit full-time employees who are paid on a monthly basis for two or more years to take one or two courses, but not more than seven semester hours and will charge \$5.00 per course plus \$21.00 per semester hour. Courses may not be audited unless at least one course is taken for credit.

Fees for Transcripts. Requests for transcripts should be directed to the Office of the Registrar. Ten days should be allowed for processing. One transcript is issued free of charge. Additional copies are supplied at \$1.00 each.

Fees for Course Changes. Changes in courses for reasons not arising within the University require a payment of \$1.00 for each change made. No course may be elected later than one week after the opening of the semester, and no student may be admitted to any class without an official enrollment.

Living Expenses

Housing. In the residence houses for undergraduate men, the rental charge for a single room is \$380.00 for the academic year or \$190.00 for each semester; for a double room the charge is \$620.00 for the academic year or \$310.00 for each occupant, or \$155.00 per semester for each occupant. Slightly higher rates will be charged in new dormitories.

In the residential units of the Woman's College the rental charge for a single room is \$405.00 for the academic year or \$202.50 for each semester. The rental charge for a double room is \$670.00 for the academic year or \$335.00 for each occupant, or \$167.50 per semester for each occupant. Detailed information concerning the student's obligations under the housing contract is published in the Woman's College Handbook.

Food Services. The dining facilities on the West Campus include three cafeterias, with multiple-choice menus, and the Oak Room where full meals and *a la carte* items are served. The cost for the academic year ranges from \$550.00 upward depending upon the taste of the individual.

The dining halls in which all resident women have their meals are located in the Woman's College Union and in Gilbert-Addoms residence hall. The charge for board is \$250.00 per semester, payable at the time of registration.

Graduate Fees and Expenses

The following table shows the general fees and charges collected from all graduate students. All fees for each semester are due and payable, unless otherwise specified, at the time of registration for that semester. All fees are subject to change without notice. No student is admitted to classes until arrangements have been made with the Bursar of the University for the settlement of fees.

Tuition and general fees* per semester (40.00 per unit)	\$600.00
Athletic Fee, not including federal tax, optional, per year, payable in the fall semester	15.00
Binding fee, two copies of thesis or dissertation, other copies optional, \$5.00 a copy	10.00
ETS Foreign Language Test, each administration, payable to the University Counseling Center	8.00
<i>In absentia</i> fee, due on date of registration one unit per semester . .	40.00
Late registration fee	5.00
Microfilming fee, doctoral degree only, upon final submission of dissertation	25.00

Housing (See detailed statement, *Bulletin of Graduate School of Arts and Sciences*.)

Tuition and fees for a full semester program of 15 units amount to \$600.00. For a part program, tuition and fees are computed at the rate of \$40.00 per unit.

Undergraduate Financial Aid

Duke University is interested in students with ability and ambition. It is the aim of the University Financial Aid Committee and others affiliated with the Financial Aid Program to provide, insofar as possible, the

*General fees, in lieu of most special charges, include the following fees: Matriculation, Medical, Library, Damage, Commencement, Diploma, and an average of the Laboratory and Material Fees.

financial assistance required by students accepted for entrance who are unable to defray the cost of college from their own resources. The assistance is made available in the form of scholarships, grants-in-aid, loans, and part-time employment.

In 1965-66 financial aid totaled \$1,601,000.00. Of this amount \$944,650.00 was allotted to 1,058 undergraduate students in the form of scholarships, grants-in-aid, and remissions of tuition; \$256,275.00 in student loans, and approximately \$400,000.00 through part-time employment on the campus and in the city of Durham and the surrounding area.

Freshmen students shared proportionately in this aid: 351 received awards totaling \$340,226.00 in direct assistance not including loans or part-time employment. Loans were made to 142 students totaling \$76,675.00 in addition to other assistance received from Duke University.

Scholarships

All undergraduate requests for application forms for scholarships, grants-in-aid, industry scholarships, or remission of tuition should be addressed to the Office of Admissions, Duke University, Durham, North Carolina 27706.

All candidates for scholarships and grants-in-aid must submit an official Application for Admission to the University and the Application for Scholarship to the Office of Admissions. Scholarship candidates who desire to be considered for the maximum value of scholarships on the basis of financial circumstances are required to submit the "Parents' Confidential Statement" of the College Scholarship Service. The "Parents' Confidential Statement" may be obtained from high school principals or upon request from the Admissions Office.

Scholarship candidates should initiate their applications during the fall semester of their senior year of study in secondary schools. Instructions concerning the specific requirements and deadline dates will accompany the application materials sent to applicants for scholarships and grants-in-aid.

Awards annually available to all undergraduate students at Duke University are listed in the *Bulletin of Undergraduate Studies*.

Engineering Scholarships

Engineering Scholarship Fund was established by gifts of various persons, to be used for scholarship aid to engineering students.

Thomas R. Mullen, Jr., Scholastic Fund was established April 5, 1949, by gift of T. R. Mullen in memory of his son, the income to be used for scholarship assistance to students in the College of Engineering. Preference is to be given students who are children of employees of the

Lehigh Structural Steel Company or others nominated by the Company. One award is available each year.

Jones Scholarship Fund was established in 1951 by Edwin L. Jones, Sr., '12; Annabel Lambeth Jones, '12; Edwin L. Jones, Jr., '48; Lucille Finch Jones; and the J. A. Jones Construction Company in memory of James Addison Jones and Raymond A. Jones; a portion of the income to be used for scholarship aid to worthy and qualified students in Civil Engineering.

Alcoa Scholarship in Engineering was established in 1962 by the Alcoa Foundation. One award of \$625.00 per year is made to a student preparing for a career in either electrical or mechanical engineering.

Western Electric Fund Scholarship was established in 1957 by gift of the Western Electric Fund; a scholarship in the amount of \$800.00 is given annually to an outstanding student in the field of electrical engineering who has completed the sophomore year of study.

Union Bag-Camp Corporation Scholarship was established in 1957 by gift of the Union Bag-Camp Corporation to provide a scholarship of \$600.00 to a student in the fields of chemistry or mechanical engineering in alternate years.

Duke University participates in several other industry scholarship programs. Several of these awards for which freshmen may apply are assigned to engineering students annually although they are not restricted to students in this field of study. Among the available awards are the General Motors Scholarships and the Texas Company Scholarships.

Tuition Grants

Tuition grants are available to children of certain qualified staff members of Duke University for a maximum of eight semesters of undergraduate study at Duke.

Loans

Loan funds held in trust by the University as well as funds supplied by the federal government through the National Defense Education Act of 1958 are available to qualified students. Freshmen as well as upperclassmen are eligible to apply for a student loan.

For details concerning loans, see the *Bulletin of Undergraduate Instruction*.

The Student Loan Committee in approving loan applications selects those students who from the standpoint of character, scholastic attainment, personality, and degree of financial need are deserving of this consideration.

Employment Opportunities

The Financial Aid Office maintains an employment office to serve students who need part-time jobs. There are many opportunities both on the campus and in the city of Durham. A considerable number of students each year help defray their college expenses by working.

Those students accepted for admission to the College of Engineering in need of part-time employment should apply to Financial Aid Office, Duke University, Durham, North Carolina 27706. Students in the Woman's College should apply to the Assistant Dean of Undergraduate Women, 108 East Duke Building, Duke University, Durham, North Carolina 27708.

Graduate Financial Aid

Awards through the Graduate School of Arts and Sciences

For the encouragement and financial assistance of graduate students of marked ability, Duke University has established a considerable number of fellowships, scholarships, and assistantships. The stipends for these range from \$600 to \$3,400 for the academic year. Holders of grants pay tuition and other fees regularly required of all graduate students.

Fellows and scholars pay full tuition and fees and are expected to register for a full schedule of course work each semester. In general, assistants register for a four-fifths program and pay 12 units tuition and fees per semester.

Application for these awards, along with all supporting documents, must be submitted on or before February 15. Notification of awards other than assistantships may not be sent before March 21 but will be sent shortly thereafter. Late applications will be considered, should any vacancies occur in the list of appointees. No appointment is made for longer than one academic year.

Further information and application forms may be obtained from the Dean of the Graduate School, Duke University, Durham, N. C., 27706.

Special Fees for Teachers and Others

The Graduate School recognizes a special obligation to encourage the following types of students in their professional and personal advancement: (1) members of the faculties of the neighboring public schools and colleges, currently engaged in *full-time* teaching while taking courses in the Graduate School, (2) ministers of neighboring churches, (3) wives

of Duke faculty members, (4) *full-time* employees of Duke University who are paid on a monthly basis throughout the year.* The reduced fees do not apply to teachers and ministers while on leave of absence, nor to holders of fellowships, scholarships, or graduate and research assistantships, nor to part-time instructors.

Persons eligible for the reduced fee must meet the admission standards required of all graduate students and must be admitted to the Graduate School. They may enroll for one or two courses per semester (in no case totaling more than 7 units) upon the payment of a fee of \$5.00 for registration for each semester and a tuition fee of \$20.00 per unit of credit or an audit fee of \$20.00 per course.

Awards through the College of Engineering

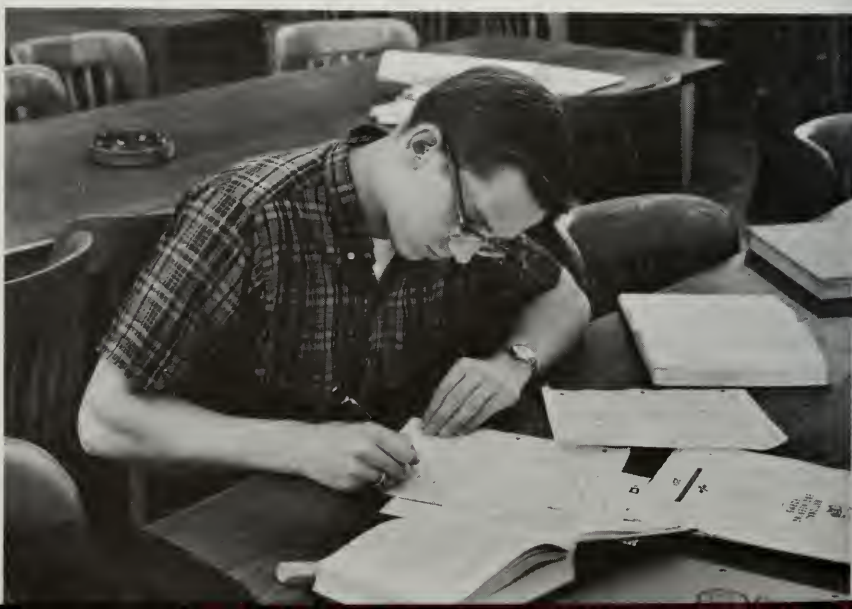
The College of Engineering and its component departments are able to offer appointments as teaching and research assistants to graduate students in engineering. Stipends range up to \$3,400 for the academic year.

Further information concerning these appointments and procedures for making application may be obtained from the Associate Dean for Graduate Study and Research, College of Engineering, Duke University, Durham, N. C., 27706.

Stipends and Income Tax

Ordinarily stipends awarded under fellowships and scholarships are not subject to income tax and Social Security Tax. However, a portion of the award to graduate assistants may be subject to tax. The Graduate Office will supply detailed information.

*Members of the Duke University faculty will be granted only Non-Degree Admission to the Graduate School of Arts and Sciences.



University Registration and Regulations

Undergraduate Registration

Pre-registration

Each new student receives a copy of the *Academic Guide for Freshmen* and the *Bulletin of Undergraduate Instruction* in the summer, and submits a trial course program for his first semester. All other students pre-register for a given semester in the fall or spring of the year on the basis of information and advising available to them. Evidence that the continuing pre-registration deposit of twenty-five dollars has been paid (see page 36 for detailed information) must be submitted at the time of spring pre-registration. A student's tentative course program is filed for permanent record in the Central Records Office after each pre-registration. He may complete his registration by mail. Students who pre-register in either semester at a date later than that specified in the calendar of the colleges are subject to a penalty of \$5.00, payable to the Treasurer. Students who do not pre-register within an allotted time must be readmitted to the college by application to the Director of Admissions.

Semester Opening and Registration

Each pre-registered undergraduate student is required to return to the

University each semester on registration day and to report to his college office by 6 p.m. Ample time should be allowed since failure to report entails loss of the continuing registration deposit and of registration in each class for which one is pre-registered. An official enrollment is required for admission to any class.

After pre-registration course changes may be made on registration day or during the first week of classes. Changes in courses for reasons not arising within the University entail a fee of \$1.00.

Undergraduate Academic Regulations

Course Requirements

During each semester of the regular academic year, the academic program of an undergraduate student normally consists of five or six courses totaling 15-17 semester hours, exclusive of physical education. A maximum program of 19 semester hours exclusive of physical education has also been fixed since the University is committed to quality work and education that is not exclusively course centered. No student is allowed to take fewer than 14 semester hours of work without special permission from the Dean or to take more than the normal load of work unless his average grade in the preceding semester is higher than a C.

Course Audit

With the consent of the instructor a full-time, degree student is allowed to audit one or more courses in addition to the normal program. After the first week of classes in any semester, no student classified as an auditor in a particular course may take the course for credit, and no student taking a particular course for credit may change classification to an auditor. A student may not repeat for credit any course he has previously audited. Auditors submit no daily work, take no examinations, and receive no credit for courses.

Course Changes

New courses may not be elected later than one week after the opening of classes during the semester. Procedures for withdrawal from a course are determined by each of the undergraduate colleges, but in any instance permission of the Dean is required.

Attendance Regulations

The attendance regulations specifically place the responsibility for class attendance upon the individual student. *He is expected to attend classes*

regularly and punctually. A student should recognize that one of the most vital aspects of a residential college experience is attendance in the classroom and that the value of this academic experience cannot be fully measured by testing procedures alone.

The members of the student body are considered sufficiently mature to appreciate the necessity of regular attendance, to accept this personal responsibility, and to demonstrate the kind of self-discipline essential for such performance and, conversely, to recognize and accept the consequences of failure to attend. An instructor is privileged to refer to the Dean for suitable action students who in his opinion are causing their work or that of the class to suffer because of absences or latenesses.

Absences from tests and required classes due to illness will be excused when certified by a proper medical official. Absences due to authorized representation of the University may be excused. Officials in charge of groups representing the University are required to submit names of those persons to be excused to the Dean's office 48 hours in advance of the hour when their absences are to commence.

Regulations for Participation in Athletics and Other Activities

Members of the athletic teams or other students groups engaging in public representation of the University are expected to be carrying their current work satisfactorily. Students may be barred from participation in such representation if, in the opinion the Dean, they fail to meet this requirement.

Grading

Final grades on performance in academic work are sent to students and parents, or guardians, after the examinations at the end of each semester. In addition, six-weeks advisory grade reports for freshmen are mailed each semester. Grade symbols are as follows:

Passing. A, exceptional; B, superior; C, average; and D, low pass.

Failing. A grade of F indicates that the student has failed the course and that to receive credit for the course he must repeat the work in class.

Absence from the final examination. In all cases in which the student is absent from a final examination he receives an X instead of a final grade. If he does not present an acceptable explanation for his absence to the Dean's office within 48 hours after the scheduled time for the examination, the X is converted to an F. A student absent from examination, if the absence has been excused by the Dean, may receive an examination upon payment of a fee of \$5.00 to the Treasurer of the University. The instructor concerned arranges for examination in cases where

absences are excused. An X not cleared by the end of the semester following the examination missed is converted to an F.

Incomplete work. If because of illness or other emergency a student's work in a course is incomplete, he may receive an I for the course instead of a final grade. Incomplete courses must be completed before the close of the succeeding semester; otherwise, the I is converted to an F and the course must be retaken if the student is to receive credit for it. In case a student whose work is incomplete is also absent from the final examination, he receives an X for the course.

Withdrawal. The letter W is used to indicate official withdrawal from a course. If a student drops a course without such permission, a grade of F is recorded for that course. If he drops with permission a course in which he is failing, the grade for that course is recorded as an F unless in the judgment of the Dean circumstances do not require this penalty but permit a notation of a W to indicate official withdrawal.

Credits

The unit of credit used is the semester hour, which signifies one class period a week throughout the semester. Two or three hours of laboratory work are equivalent to one hour of class work.

Seniors who at the beginning of a semester lack no more than nine hours for the fulfillment of the requirement of the requirements for the B.S.E. degree may enroll, with permission of the Dean of the Graduate School, in graduate courses for a maximum total program of 15 semester hours.

Advanced Placement Course Credit

Any student who has earned a score of three or higher on an Advanced Placement examination of the CEEB and is approved for placement in a sophomore-level course or above may be considered for course credit in appropriate subjects. For those presenting scores of four or five the award of credit will be made automatically upon matriculation; for those presenting scores of three it will be determined with the approval of the University department concerned no earlier than at the end of the first semester. Course credit may be granted for one or two semesters in each subject area in which examination is offered in the Advanced Placement Program.

Transfer Credit

Transfer credit is evaluated from regionally accredited, degree-granting institutions. Courses taken away from Duke in which grades of less than C have been earned are not acceptable for transfer credit. Credit for work completed at other institutions will be determined in relation to the

curriculum requirements of the college in which the student enrolls at Duke.

Credit for courses in science or language offered for advanced standing in any of the undergraduate colleges by a transfer student from a junior college will be evaluated by the departments concerned.

The maximum amount of credit acceptable from a junior college is 60 semester hours, exclusive of physical education. No credit is given for work completed by correspondence, and credit for no more than six semester hours is allowed for extension courses.

Residence Requirements

The final four semesters—or equivalent—of work must be earned in residence except in those instances in which a student has been approved to take his junior year abroad. For engineering students, 30 of these 60 semester hours must be from those normally taken in the senior year. Students who meet this requirement but who still lack six to eight semester hours in final fulfillment of requirements may take this work in another institution of approved standing, provided the course is approved by the Chairman of their major department and by the Dean.

Quality Points and Class Standing

An overall indication of the quality of student performance is provided by assigning quality points per semester hour of a course as follows: an A = 4; B = 3; C = 2; D = 1; and F = 0. On the basis of these points there is maintained for students a Duke cumulative average (determined by dividing the number of quality points earned at Duke by the total number of hours carried at Duke—not semester hours passed).

A student in the College of Engineering matriculating after September 1, 1965, must achieve at least the following for continuation from:

The first to the second year	18 s.h. credit and a q.p.r. of 1.30
The second to the third year	46 s.h. credit and a q.p.r. of 1.60
The third to the fourth year	74 s.h. credit and a q.p.r. of 1.70
The fourth to the fifth year (if needed)	102 s.h. credit and a q.p.r. of 1.80

Freshmen must also pass at least six semester hours of work in their first semester, three required courses in the second semester, and 18 semester hours in the first year; all other students must pass at least nine semester hours each semester. Physical education credits are excluded in each case.

To rank as *sophomores*, students must have to their credit at least 24 semester hours and must have passed certain specially designated courses of the freshman curriculum; as *juniors*, at least 60 semester hours and must have passed certain specially designated courses of the sophomore cur-

riculum; and as *seniors*, at least 96 semester hours and must have passed certain specially designated courses of the junior curriculum.

Requirements for Graduation. For graduation from the College of Engineering, in addition to completion of an approved curriculum, a student matriculating after September 1, 1965, must meet at least the following minimum requirements: the completion of 134 semester hours; a cumulative q.p.r. of 1.90; and a q.p.r. of 2.0 in all work, as well as in all engineering work, taken after having attained senior standing.

Commencement

Degrees are awarded in June at commencement to those who have completed requirements at the end of either regular semester of the academic year. They are awarded at the end of the summer to students who complete degree requirements in a summer session.

Eligibility for Undergraduate Academic Honors

Dean's List

In recognition of academic achievement, students who earn an average quality point ratio of 3.0 or higher on a semester's work of not less than the minimum academic load are placed on the Dean's List.

Class Scholars

The five students in each combined undergraduate class of the University (including Trinity College, The Woman's College, and the College of Engineering) who achieve the highest quality point ratio on at least a normal course load for each academic year shall be designated Class Scholars.

Class Honors

To be eligible for Class Honors a student must earn, during the year, credit for at least the minimum academic load permitted by the college in which he is registered. Students in the freshman, sophomore, and junior classes who earn a 3.50 quality point ratio on all work for the year are eligible for Class Honors.

Graduation Honors

To be eligible for consideration for Graduation Honors a student must have completed in residence a minimum of ninety semester hours. Stu-

dents who earn an average of at least a quality point ratio of 3.50 are recommended for a degree *magna cum laude*. Those who earn a quality point ratio of 3.75 are recommended for a degree *summa cum laude*.

Graduation with Departmental Distinction

Graduation with Distinction in Civil, Electrical, or Mechanical Engineering is awarded to the student who, in the opinion of the department and of a special committee of the faculty, has demonstrated exceptional achievement in the area of his special interest.

Honors-Masters Program

(See *Bulletin of Undergraduate Instruction* for description.)

Distinguished Professor Seminars

(See *Bulletin of Undergraduate Instruction* for description.)

Graduate Registration

The requirements regarding who must register are as follows: (1) All students who enter course work or residence for credit; (2) all students who have completed minimum requirements for an advanced degree, but continue to use the facilities of the University in their research; (3) all students in the absentia status; and (4) all students who wish merely to audit a course or courses.

Registration

After the applicant has received notification of his admission to the Graduate School of Arts and Sciences and has returned his statement of acceptance of admission, he may present himself for registration. During the registration periods, announced in the Bulletin, he first confers with the Director of Graduate Studies of his major department, who prepares and signs a course card, listing the course work to be taken during the semester. The student then presents this course card to registration officials, who enroll him officially in his courses. After his first registration period as a current student he will pre-register at the stated times for pre-registration. Failure to pre-register incurs the penalty for late registration. Former students who intend to register to resume a degree program must give the Department and the Dean notice of this intention two months before registration.

Late Registration

All students are expected to register or pre-register at the times stated in the Bulletin. Those registering late are subject to a late registration fee of \$5.00.

Change of Registration

During the academic year within a period of fourteen days from the registration date students may change registration with the approval of the Director of Graduate Studies, if no reduction of fee is involved, and with the approval of the Dean if reduction of fee is involved. Thereafter during the first thirty days from the registration date the only permissible change is dropping course-seminar registration and adding equivalent units of research, with the approval of the Director of Graduate Studies, the instructor of the course, and the Dean of the Graduate School of Arts and Sciences.

Normal Registration

A graduate student is designated as fully registered when he registers for the maximum credit his program requires. Required registration is set in consideration of the student's obligation to teach or assist and the stage he has reached in completion of degree requirements. In the *academic year* normal registration for the resident student who does not hold an appointment as a part-time instructor or assistant or does not engage in part-time work is 15 units a semester or 30 units an academic year. The normal registration for the student who holds such an appointment or undertakes such work is either 12 units or a minimum of 9, depending upon the number of hours a week he is required to devote to such duties.

The resident student in a terminal master's program carries a normal registration until he has met all requirements except for submitting his thesis. Thereafter, until submission of the thesis, he registers for 3 units a semester while in residence or, if he elects to go out of residence, for 1 unit *in absentia* each semester until the thesis is accepted.

The resident student engaged in a master's program which is not terminal but preparatory to a doctoral program registers as though he were a doctoral student.

The resident student in a doctoral program carries normal registration through the semester in which he passes the preliminary examination. If he remains in residence, he continues to register for a minimum of 3 units a semester until the dissertation is accepted. If, before or after passing the preliminary examination, he elects to go out of residence, he registers for 1 unit a semester *in absentia* in order to keep his program active.

It is necessary to be a fully registered student according to the regula-

tions listed above (except when registered in absentia) in order to establish eligibility for library carrel and laboratory space, for student housing, for University and some outside loans, for Student Health service including the voluntary Walker plan coverage, and for reporting status for military duty.

The registration of 1 unit a semester in absentia provides occasional consultation with the thesis or dissertation supervisor. It may be waived for military duty or serious problems of health.

In the Summer Session 6 units a term is maximum registration. Students resident in the academic year who wish to continue study and use of University facilities including Summer Session Student Health during the summer must register for 1 unit in the first Summer Session term. This registration provides use of these facilities for both terms.

Regulations Governing Graduate Degrees

Work in the College of Engineering toward the degree of Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) is taken subject to the regulations of the Graduate School of Arts and Sciences, as well as those of the College of Engineering.

The Master of Science

Prerequisites

The degree of Master of Science is offered with a major in the fields of civil, electrical, and mechanical engineering. As prerequisites to this degree the student must have earned from an accredited college the Bachelor of Science in Engineering degree, or its equivalent, and completed a minimum of 12 semester hours work in the major field.

Residence Requirements

Candidates for the Master of Science degree must spend, as a minimum, one full academic year, or its equivalent as defined by the Graduate School of Arts and Sciences, in residence at Duke University. If after completion of the 30-unit requirement the candidate remains in residence, he must register for a minimum of 3 units per semester.

A Master's candidate who in the academic year presents a thesis when not registered in residence will be charged 1 unit of residence for the semester in which the thesis is presented. (For regulations governing work taken or requirements completed during the Summer Session see the *Summer Session Bulletin*.)

Foreign Language

There is no foreign language requirement for this degree.

Major and Minor Subjects

The work for the Master of Science degree is designed to provide a broad foundation at the graduate level in the fields of civil, electrical, and mechanical engineering. The student must present acceptable grades for a minimum of 24 units of graduate courses: at least 12 in course work in his major area of concentration in engineering (not necessarily confined to the offerings of the engineering department in which the student is registered); a minimum of 6 units in a minor subject outside of engineering which lends broad support to his program (usually in the mathematical or natural sciences); and the remaining 6 of the 24-unit course requirement in either the major or minor subject, or in an area approved by the major department and by the Dean of Engineering. In addition to the 24-unit course requirement, the student must present a thesis, which carries a credit of 6 units. Thus his earned credit for the degree totals a minimum of 30 units.

Candidacy for the Master of Science Degree

To be considered as a candidate for the Master of Science degree, the graduate student must (1) have made passing grades in all courses taken during the first period of residence (if he registers for fewer than 12 units of graduate courses during his first period of residence, he must make passing grades on the first 12 units of graduate courses), (2) have made a grade of G or E on at least 3 units of this work, and (3) have received the approval of the major department.

Time Limits for Completion of the Master of Science Degree

The candidate for the Master of Science degree who is in residence for consecutive academic years should complete all requirements for the degree within two calendar years from the date of his first registration in the Graduate School. Any candidate must complete all requirements within six calendar years of his first registration.

The Thesis

The thesis should demonstrate the student's ability to collect, arrange, interpret, and report pertinent material on his special research problem.

Filing the Thesis Title. At least one month before presenting the thesis, that is on or before March 1 for a June degree or on or before July 1 for a September degree, the student must file with the Dean of the Graduate

School, on the official form, the title of the thesis and declaration of intention to graduate. The title must have the approval of the Director of Graduate Studies in the major department, and of the thesis supervisor.

Preparing the Thesis. All basic requirements for preparing the thesis are described in the Manual of Style for Theses and Dissertations, revised 1961, obtained at the Duke University Book Store, West Campus. The quality of paper, form, and binding are prescribed in the Manual.

Submitting the Thesis. Four typewritten copies of the thesis bound in snap binders supplied by the Library must be submitted in approved form to the Dean of the Graduate School on or before May 1 for a June degree or August 15 for a September degree and at least three days before the scheduled date of the student's examination. The copies will then be distributed to the several members of the examining committee. Two copies for the Library will be bound by the Ruzicka Bindery, fee \$5.00 a volume. The student will state whether or not he wishes more than two so bound.

The Examining Committee and the Examination

The instructor who directs the thesis appoints an examining committee composed of the supervisor of the thesis and two other members of the Graduate Faculty, one of whom must be from a department other than that of the major. If the student has been permitted to take related work within the major department, the third member may represent the minor field within the department. This committee is submitted for approval to the Dean of the Graduate School when the thesis is first presented.

The candidate appears before this committee for an examination which lasts for about one and one-half hours. The subject matter covered in the examination is usually restricted to the thesis and to the major field.

If the candidate passes his examination, the examining committee certifies this fact by signing the title page of all copies of the thesis. The candidate then returns the original, the first carbon copy of the thesis, and any others he wishes bound by Ruzicka, to the Dean of the Graduate School, who deposits them in the University Library.

The Doctor of Philosophy

The degree of Doctor of Philosophy is offered in the fields of civil and electrical engineering. It is essentially a research degree. Although course work is a necessary part of the student's program, the mere accumulation of course credits will not be sufficient for attaining this degree. The granting of the Ph.D. is based primarily upon the student's knowledge of a specialized field of study and upon the production of an acceptable dissertation embodying the results of original research.

Requirements for the Ph.D. Degree

The formal requirements, discussed in detail below, for the Ph.D. degree are as follows: (1) foreign language; (2) major and minor courses; (3) supervisory committee for program of study; (4) residence; (5) preliminary examination; (6) dissertation; (7) final examination. In order to be considered for candidacy for the Ph.D. degree, the student must have passed all of his course work in the first year of graduate study; on at least 9 units of course work he must have made a grade of G or better.

Foreign Languages. A reading knowledge of two acceptable foreign languages is required (normally two of the following: French, German, or Russian). A student working toward the doctoral degree should complete the language requirements for that degree at the earliest possible date.

Special courses designed to assist graduate students in acquiring a reading knowledge of French or German are offered for three hours a week, French during the fall semester, German during the spring semester and the Summer Session. A student who registers for either course must reduce his normal load of graduate courses by three units, with no reduction in fees. *No auditors* are permitted in these courses at any time.

Major and Minor Subjects. The student must present acceptable grades for a minimum of 48 units of graduate courses: at least 24 in course work in his major area of concentration in engineering (not necessarily confined to the offerings of the engineering department in which the student is registered); a minimum of 12 units in a minor subject outside of engineering which lends broad support to his program (usually in the mathematical or natural sciences); and the remaining 12 of the 48-unit course requirement in either the major or minor subject, or in an area approved by the major department and by the Dean of the College of Engineering.

Residence. For students who first registered in September, 1959, or thereafter, the minimum registration requirement is 60 units of graduate credit not more than 30 units of which may be accepted by transfer. Since a full program is 30 units per academic year, the prospective Ph.D. candidate who enters with the B.S. degree must plan to spend in residence a minimum of two academic years; if he enters with the M.S. degree, his minimum residence is one academic year. If there are undergraduate deficiencies in his program, he may in addition to the minimum requirements be required to take preliminary undergraduate courses for which he will not receive graduate credit. Even if there are no such undergraduate deficiencies, the student's supervisory committee will determine what requirements, if any, above the minimum the student must meet.

For requirement of registration see Normal Registration, page 50.

Committee to Supervise the Program of Study

The Director of Graduate Studies of the major department will, during the first period of full-time registration of each doctoral aspirant, appoint a program advisory committee consisting of three members of the Graduate faculty in areas relevant to the student's intended major. This committee will guide the student in the initial stages of his program.

Not later than two months before the preliminary examination the Director of Graduate Studies in the major department will nominate for approval of the Dean of the Graduate School of Arts and Sciences a supervisory committee of five, one being designated as chairman. This committee will include at least three members of the major department and one from the minor. This committee will draw up a program of study and administer the preliminary examination and, with such necessary changes as are approved, the final doctoral examination. The final examination may be administered with a minimum of four members.

When the preliminary examination is arranged, the committee and the Director will submit to the Dean of the Graduate School the student's program of study bearing a statement that the Department's course and language requirements have been or are being completed.

Time Limitations

1. At the time that the preliminary examination is passed any courses, language certifications, or other credits for advanced standing which are more than six calendar years old will not be accepted toward fulfilling the minimum requirements of the doctoral degree.

2. The student should normally pass the preliminary examination by the end of his second year of graduate study. If he has not passed it by the middle of the third year, he must file with the Dean of the Graduate School a statement explaining the delay and setting a date for the examination. Except under unusual circumstances, extension will not be granted beyond the end of the third year.

3. The doctoral dissertation should be submitted and accepted within two calendar years after the preliminary examination is passed. Should the dissertation not be submitted and accepted within four years after the examination, the candidate, with the approval of his committee, may petition the Dean of the Graduate School for an extension of one year. Should this extension be granted and the dissertation not be submitted and accepted within the year, the student to remain a candidate for the degree must pass a second preliminary examination. In such a case, the time limit for submitting the dissertation will be determined by the Dean of the Graduate School and the candidate's committee.

Credit for Summer Work

Credit earned in the Summer Session will not reduce the minimum required residence (see above, p. 51).

Preliminary Examination

A student is not accepted as a candidate for the Ph.D. degree until he has passed the preliminary examination. A transfer student who may have passed a preliminary examination elsewhere must nevertheless take the examination in this Graduate School. The examination ordinarily covers both the major and minor fields. The preliminary examination for a student majoring in engineering must contain an oral component of approximately two hours' duration and may, at the discretion of the committee, include a written component.

In the summer, a preliminary examination may be scheduled only between the opening and closing dates of the Summer Session.

Privilege of Re-Examination. Should the student fail the preliminary examination, he may apply, with the consent of his supervisory committee and of the Dean of the Graduate School, for the privilege of a second examination to be taken no sooner than three months after the date of the first. Failure on the second examination will render the student ineligible to continue his program for the Ph.D. degree at Duke University.

The Dissertation

The dissertation is expected to be a mature and competent piece of writing, embodying the results of significant and original research.

Filing Title. Not later than March 1 (March 2 if March 1 falls on Sunday) preceding the June commencement at which the degree is expected to be conferred, the student must file with the Dean of the Graduate School, on the official form to be obtained from the Graduate Office, the title of the dissertation. This title must receive the written approval of both the Director of Graduate Studies of the student's major department and the professor who directs the dissertation.

Form. The basic requirements for preparing the dissertation such as quality of paper, form, and binding are prescribed in the instructions for microfilming (see below) and in the Manual of Style for Theses and Dissertations, revised 1961, to be obtained from the Duke University Book Store, West Campus.

Submitting Dissertation. The dissertation must be completed to the satisfaction of the instructor who directs it. Four typewritten copies bound in snap binders obtained in the Library must be deposited with the Dean of the Graduate School on or before April 15 preceding the June commencement when the degree is to be conferred. The dissertation must

be submitted to the Graduate Office at least seven days before the scheduled date of the student's examination.

Publication on Microfilm. All doctoral dissertations will normally be published on microfilm through University Microfilms, Ann Arbor, Michigan. Authors may, if they wish, also copyright them. The abstract will be published in Dissertation Abstracts. Before final typing is completed, the candidate should obtain in the Graduate Office detailed instructions on the procedure and the microfilming agreement.

In brief, all copies of the dissertation, the original in clean type, will remain unbound except for spring binders. Ten copies of an abstract carefully written and not more than 600 words long, are submitted when the dissertation is first presented to the Graduate Office. A nonreturnable dissertation fee of \$25 is charged for handling and microfilming. If copyright is desired, an additional fee is charged of \$6 plus 2-½ cents per page. The original copy and first carbon copy will be bound by the Ruzicka Bindery. The fee is \$5.00 a volume. The student may request that more than the two copies be so bound.

Final Examination

The final oral examination shall be primarily on the dissertation. Questions may, however, be asked in the candidate's major field. Except in unusual circumstances approved by the Dean a final examination will not be scheduled between the last day of the spring examination period and registration day in the fall semester.

If a student fails his final examination, he may be allowed to take it for a second time, but not sooner than six months from the date of his first. Permission to take the second examination must be obtained from the instructor who directed the dissertation and from the Dean of the Graduate School. Failure to pass the second examination renders the student ineligible to continue work for the Ph.D. degree at Duke University.

Deposit of the Dissertation. After the examination has been passed, the candidate brings to the Graduate Office the original and first carbon copies of the dissertation, properly signed, and any other copies he wishes bound by Ruzicka. At this time he signs the microfilming agreement and pays such binding and copyright fees as are due.

Graduate Academic Regulations

Grades, Hours, and Credits

Although ideally graduate study is principally individual reading, research, and laboratory experimentation under guidance, academic

progress in the United States is generally measured and recorded in terms of course hours and credits. The term *residence* designates full-time study and research in close proximity to facilities provided for both as opposed to part-time study incidental to a full-time occupation. Here required residence of one year is defined as two successive academic semesters of not less than nine units registration each semester. Credit for courses and seminars, research, and residence, and corresponding tuition and fees are stated in terms of units. According to conventional measurement one unit is equivalent to one semester hour.

Credits Earned Outside this Graduate School

Graduate Credit Earned before the B.S.E. Degree is Granted. Ordinarily no credit will be allowed for graduate courses earned before a student has been awarded his B.S.E. degree. However, an undergraduate student at Duke University who, at the beginning of his final semester, lacks no more than 9 semester hours of fulfilling the requirements for the B.S.E. degree, may obtain permission from the Dean of the Graduate School to enroll for graduate courses sufficient to bring his total program to fifteen hours a week. Such graduate courses will be credited toward the M.S. degree, provided that the student meets the requirements for admission to the Graduate School, and that he is duly registered in the Graduate School at the beginning of the final semester.

Duke undergraduates in the Honors-Masters program provisionally may be granted this type of admission at the beginning of their seventh semester provided that at the beginning of their final semester they will meet the requirement stated above.

Under certain circumstances a maximum credit of 6 units may be allowed toward the M.S. degree for graduate courses completed elsewhere. The acceptance of credit up to this amount, however, will not reduce the minimum of required registration at Duke University. (See below.) With the approval of both the student's major department and the Dean of the Graduate School, a student who is granted such transfer credit may be permitted to register for as much as 12 units of thesis research instead of the usual 6 units. Or he may be permitted to fill out his schedule with as much as 6 units of further undergraduate training or 6 units of required language courses on the undergraduate level. In no case will credit be allowed for extension or correspondence courses.

Under appropriate circumstances up to 30 units of graduate credit may be accepted toward the Ph.D. degree for students entering with the M.S. degree from another institution.

Transfer of Graduate Credits. Credit for graduate course work earned at another institution will be determined only after a student has spent one semester at Duke University. After completing his first semester, the

student through his Director of Graduate Studies should file a request that his credits be reviewed and a decision be made.

Reciprocal Agreement with the Consolidated University of North Carolina. Under a plan of cooperation between the University of North Carolina and Duke University, students regularly enrolled in the Graduate Schools of the University during the regular academic year, and paying full fees to that institution, may be admitted to a maximum of two courses per semester in the Graduate School of Duke University upon payment of a nominal registration fee of two dollars and of any other special fees regularly required of all students. Under the same arrangements, students in the Graduate School of Duke University may be admitted to course work at the University of North Carolina. A similar arrangement is effective in the Summer Session. (See the *Summer Session Bulletin*.)

Grades

Grades in the Graduate School are as follows: E, G, S, F, and I. E (exceptional) is the highest mark. G (good) and S (satisfactory) are the remaining passing marks. F (failing) is below passing, and I (incomplete) indicates that some portion of the student's work is lacking, for an acceptable reason, at the time the grades are reported. The instructor who gives an I for a course specifies the date by which the student must have made up the deficiency, in no case more than one calendar year from the date the course ended. If the course is not completed, the grade of F is entered upon the student's record unless his appeal to the Dean for the grade No Credit is approved. The grade of Z indicates satisfactory progress at the end of the first semester of a two-semester course. It will be changed to whatever grade is appropriate upon the completion of the course. A grade of F in a major course normally occasions withdrawal from a degree program not later than the end of the ensuing semester or term; a grade of F in a minor course occasions academic probation.

Courses Primarily for Undergraduates

Students granted provisional admission and others whose preparation is found deficient may on occasion be required as part of their program to take undergraduate courses as prerequisites to continued graduate study. Undergraduate courses thus taken and others elected by the student will carry no graduate credit.

In exceptional cases, 100-level courses outside the major department may be taken for graduate credit to a maximum of two one-semester courses or one year-course not exceeding a total of 8 units, when approved by the Directors of Graduate Studies in the major department and in the department in which the course is listed and by the supervisor of the program.

Withdrawal and Interruption of Program

From a Course. For permissible changes during the first thirty days after the registration date, see Change of Registration, page 44. If a course is dropped without the necessary approval, the permanent record will list the course as Dropped Unofficially, F. If a course is dropped after the thirty-day period, the status of the student at the time of withdrawal from the course will be determined and be indicated on the permanent record as Withdrew Passing (W.P.) or Withdrew Failing (W.F.).

From the Graduate School. The University reserves the right, and matriculation by the student is a concession of this right, to request the withdrawal of any student whose conduct at any time is not satisfactory to the University, even though no specific charge be made against the student. If a student wishes for any reason to withdraw from the Graduate School, he should notify both the Director of Graduate Studies in his major department and the Dean of the Graduate School prior to the date of his expected withdrawal. (For refunds upon withdrawal, see above, p. 50.) For withdrawal occasioned by academic failure, see above.

Students who find it necessary to interrupt their program of study for a period longer than a summer vacation should, before departure, leave with the Graduate Office a statement of the reason for interruption, mailing address, and expected date of return. If they are subject to registration in absentia, they should arrange for such registration before departure.

A foreign student who after successfully completing a minimum of one semester's graduate study must withdraw for the purpose of returning home before the completion of a graduate program may with the approval of his major department request the Dean to issue him a Certificate of Graduate Study.

Transcript

A student who wishes to transfer his credits from Duke University to another institution is entitled to one free transcript of his record. A fee of one dollar, payable in advance, is charged for each additional copy. Requests are directed to the Central Records Office.

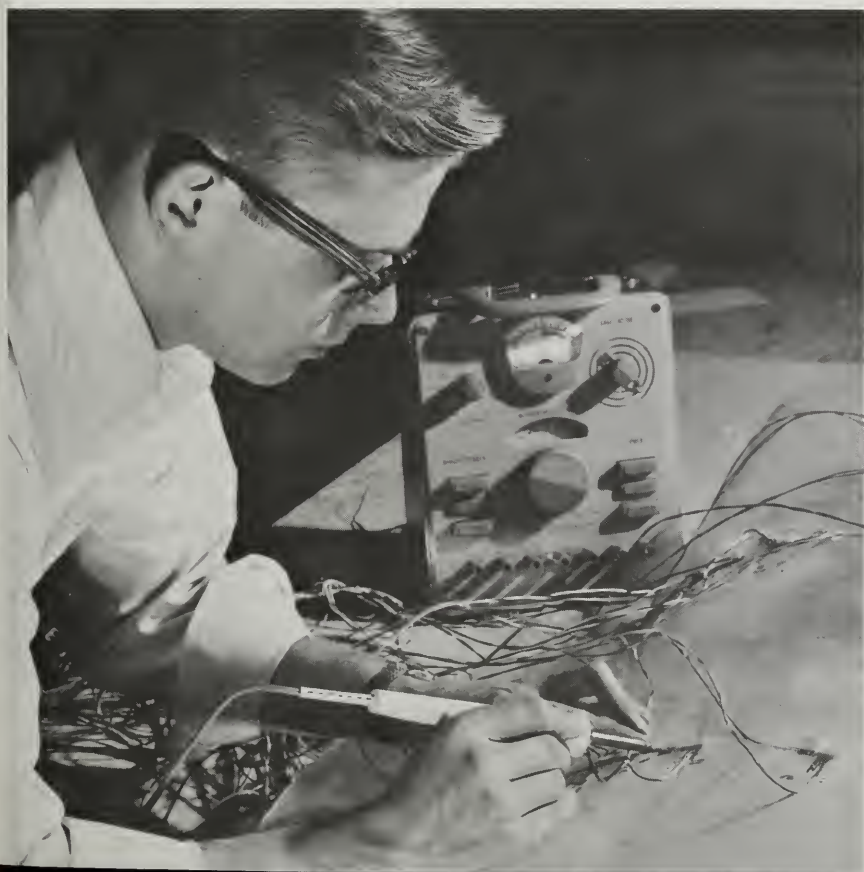
Undergraduate Nonacademic Regulations

Conduct and Discipline

The University expects of its students loyal and hearty cooperation in developing and maintaining high standards of conduct as well as of

scholarship. General University regulations concerning conduct of students are made available to students when admission is offered, or upon request. The student in accepting admission indicates his willingness to subscribe to those regulations. The University reserves the right, and matriculation by the student is a concession of this right, to ask the withdrawal of any student whose conduct at any time is not satisfactory to the University, even though no specific charge may be made against the student.

General oversight of the conduct of students and the administering of discipline are under the supervision of appropriate deans. Immediate supervision is entrusted to the Dean of Men and the Dean of Women. However, through the expressed willingness of the students of the University to assume the responsibility of maintaining high standards of morality, the student body has become to a great degree self-governing. Two councils, one of men and the other of women, each composed of duly elected representatives of the student body, exercise the authority granted the students by their respective colleges to investigate all cases of misconduct, as well as all other cases of violation of proper standards and traditions, and to make recommendations of penalties based on their finding. They exert a guiding and stimulating influence for the promotion of high ideals of conduct among students.



Courses of Instruction

Undergraduate Engineering Non-Departmental Courses

Dean Meriam; Assistant Dean Kraybill

Engrg 1. *Engineering Design I.* Introduction to the "engineering process" through solving problems of engineering design. Problems are posed so that the student will gain some experience in utilizing his knowledge to devise logical solutions. Elements of engineering graphics are included as a means of visualizing and communicating engineering problem solutions. 2 s.h. *Bock, Hill, Lewis, and Sheppard*

Engrg 2. *Engineering Design II.* Continuation of engineering design, the problems being larger in scope than those of the first semester, involving larger design teams, the supposition of more realistic budgets, and closer attention to ultimate feasibility. Principles of orthographic projection applied to graphics problems involving intersections and development of surfaces and the relationship of lines and planes; charts, graphs, graphical calculus. Introduction to use of digital computer in engineering design. 2 s.h. *Bock, Hill, Lewis, Sheppard, and Wells*

Engrg 23. *Statics.* Analysis of force systems and their equilibrium as applied to engineering systems; algebraic methods used with vector notation where appropriate. Principle of virtual work, stability of equilibrium; friction; distributed force systems; equilibrium of differential elements. Corequisite: Math 22. 3 s.h.

Engrg 53. *Engineering Design III.* An introduction to the theory and

techniques of measurement with emphasis on the design of measurement systems: the nature of experimental error, interpretation of experimental data, and error analysis. Laboratory with design and execution of selected measurement problems. Prerequisite: Math 22. 2 s.h.

Engrg 57. Statics. A study of force systems equilibrium by algebraic and graphic methods, friction, centroids, moments of inertia. Prerequisite: Engrg 1. Concurrent: Phys 41 and Math 63. 3 s.h. (Not offered after 1965-66) *Arges, Bock, Harrawood, and Holland*

Engrg 60. Engineering Mechanics. A study of statics and dynamics, as applied to particles and rigid bodies. Fundamentals are developed using vector and scalar values. Concurrent: Phys 41 and Math 63. 4 s.h. (Not offered after 1965-66) *Barton, Holland, Nash, and Wood*

Engrg 63. Introductory Electric Systems I. Complete analysis (transient and steady state) by transform methods of linear lumped parameter networks. Primary emphasis on electric networks but mechanical and electro-mechanical networks included. Application of modern analysis techniques to present day electrical engineering systems that are of concern to all engineers, e.g., amplifiers and transducers. Laboratory included. Corequisites: Math 63 and Phys 41. 4 s.h.

Engrg 73. Mechanics of Deformable Bodies. Stresses and strains in deformable bodies; mechanical behavior of materials and relation of stress to strain; applications of principles to static problems of beams, torsion members, columns, elementary shells; introduction to energy principles, applications. Selected laboratory work. Prerequisite: Engrg 23. 3 s.h.

Engrg 83. The Structure and Properties of Solids. An introduction to materials science and engineering, emphasizing the relationships between the structure of a solid and its properties. The atomic and molecular origins of electrical, mechanical and chemical properties are treated in detail for metals, alloys, polymers, ceramics, glasses and composite materials. Prerequisite: Chem 2. Corequisites: Math 63 and Engineering 73. 3 s.h. *Pearsall*

Engrg 101. Thermodynamics. A basic study of the laws of thermodynamics and their use in engineering analysis and design. The study of the thermodynamic properties of substances is included. Prerequisites: Chem 2 and Phys 42. 3 s.h.

Engrg 107. Mechanics of Materials. Stresses and strains in elastic bodies; shear and moment diagrams; stresses in beams; beam deflections by double integration and area-moments; statically indeterminate beams, torsion, principal stresses. Prerequisite: Engrg 57 or Engrg 60. Concurrent: Math 64. 3 s.h. (Not offered after 1965-66) *Arges and Palmer*

Engrg 109. Mechanics of Materials Laboratory. Study and use of testing machines and strain gages; tests to determine significant mechanical properties of common engineering materials; experimental verification of the elementary theory of structural members. Concurrent: Engrg 107. 1 s.h. (Not offered after 1965-66) *Barton and Sheppard*

Engrg 113. *Introductory Electric Systems II.* A continuation of Engrg 63. Selected laboratory work. 3 s.h.

Engrg 115. *Dynamics.* General principles of dynamics as applied to particles and rigid bodies. Translation, rotation, general plane motion, work and energy, impulse and momentum, gyroscopic motion. Prerequisite: Engrg 57. Concurrent: Math 64. 3 s.h. (Not offered after 1966-67) *Arges*

Engrg 123. *Dynamics.* General principles of dynamics of engineering systems. Kinematics of motion; dynamics of particles, systems of particles, rigid bodies. Impulse-momentum and work-energy principles. Introduction to advanced methods in dynamics; Lagrange's equation. Prerequisites: Engrg 23 and Phys 41. Corequisite: Math 64. 3 s.h.

Engrg 128. *Fluid Mechanics.* Physical properties of fluids, fluids statics, continuity and energy principles, pressure-momentum principle, elementary principles of turbines and pumps, flow of a real fluid, dimensional analysis and dynamic similarity, fluid flow in closed conduits and in open channels; fluid measurements. Concurrent: Engrg 60 or 115. Prerequisite: Math 64. 3 s.h. (Not offered after 1966-67) *Harrawood*

Engrg 133. *Heat Transfer.* An introduction to the concepts of conduction, convection and radiation. A study of temperature gradients, steady and transient heat flow by analytical, graphical, numerical and analogical methods. Selected laboratory work. Corequisites: Engrg 101 and Math 64. 2 s.h.

Engrg 143. *Fluid Mechanics.* Physical properties of fluids; fluid flow concepts and basic equations; continuity, energy and momentum principles; dimensional analysis and dynamic similitude; viscous effects; applications, emphasizing one-dimensional flow theory for incompressible, real fluids. Selected laboratory work. Corequisites: Engrg 123 and Math 64. 2 s.h.

Engrg 163. *Fields.* Treatment of selected topics in field theory of interest to engineers. Basic field concepts, the Laplacian, field sources, waves, diffusion, continuum concepts, the wave nature of elementary particles. The common structure of field theory is applied to selected topics such as thermal conduction, fluid fields, stress-strain in elastic solids, electric and magnetic fields, and electromagnetic fields. Selected laboratory work. Corequisites: Math 111; Engrg 113, 123, 133, and 143. 3 s.h.

Electives

Engrg 169.* *Legal Aspects of Engineering.* A course designed to introduce engineering students to those aspects of the law encountered in the practice of engineering. Subjects included are: contracts and specifications, real and personal property, torts, insurance, agency, equity, evi-

*Offered only upon sufficient demand; enrollment limited.

dence, labor management, sales, expert testimony, engineering registration and ethics. Open to seniors only. 3 s.h. *Ross*

Engrg 170.* *Patent Law for Engineers.* A course designed to familiarize engineering students with the legal principles and procedures for protecting patentable inventions, such as drafting and analysis of specifications and claims, study of infringements, assignments, licenses, and record documentation. Open to seniors only. 3 s.h. *Olive*

Civil Engineering

Undergraduate Courses

Professor Brown, *Chairman*; Professor Bryan, *Director of Undergraduate Studies*

CE 61. *Plane Surveying.* Use and adjustment of instruments; transit-tape, stadia, and plane table surveying; differential and profile leveling; calculation of bearings, latitudes, departures, and areas; accuracy and errors; topographic mapping; rural and urban land survey; celestial observations for azimuth; triangulation; introduction to photogrammetry. Prerequisites: Engrg 1 and Math 21. 5 s.h. (Not offered after 1965-66.) *Sheppard*

CE 72. *Materials Laboratory.* Blending of granular materials and determination of their physical properties, design of concrete and bituminous mixtures, consistency limits of soils. 1 s.h. (Not offered after 1965-66.) *Holland*

CE 96. *Geodetic and Location Measurements.* The theory of measurements and errors associated with controlling and locating systems of constructed facilities; modern field methods and equipment. Laboratory included. Prerequisite: Engrg 53. 3 s.h.

CE 101. *Soil Mechanics Laboratory.* Soil exploration and sampling. Laboratory determination of index properties: water content, void ratio, particle size, Atterberg limits. Consolidation testing. Triaxial shear testing. Classification and identification of soils. Compaction testing. Demonstrations of seepage, bearing capacity and earth pressure phenomena. Concurrent: CE 135. 1 s.h. (Not offered after 1967-68.) *Holland and Vesic*

CE 110.* *Plane Surveying.* Use and adjustment of instruments; transit-tape, and stadia surveying; differential and profile leveling; calculation of bearings, latitudes, departures, and areas; accuracy and errors; topographic mapping. Prerequisites: Engrg 1 and Math 21. 3 s.h. *Arges*

CE 113. *Route Surveying.* Simple, compound and reverse curves; spirals; earthwork and grading plans. Prerequisite: CE 61. 2 s.h. (Not offered after 1966-67.) *Sheppard*

*Offered only upon sufficient demand; enrollment limited.

CE 116. *Transportation Engineering.* History of transportation problems; highway, air, pipeline, mass and rapid means of transporting people and materials; design problems requiring the collection and processing of data; selection of transportation means, development of routes, and evaluation of solutions. Concurrent: CE 96. 3 s.h. *Holland*

CE 118. *Materials of Construction.* Determination of physical and mechanical properties of construction materials and their components; use of properties as a basis for design; effect of loading, time, and environment on properties; design of construction materials. Laboratory included. Prerequisites: Engrg 73 and 83. 2 s.h.

CE 121.* *Hydrology.* Fundamentals of meteorology; precipitation; evaporation. Ground water development. Stream flow and stream gaging. Hydrograph analysis. Flood routing. Field trips to be arranged. Prerequisite: Engrg 128 or 143. 3 s.h. *Bryan*

CE 123. *Fundamentals of Hydraulic Engineering.* Steady pipe flow systems, including compound pipes and pipe loops and system components including pumps, turbines, and valves. Unsteady pipe flow and surge control systems. Analog computer applications to hydraulic transient analysis and design. Flow in open channels. Water surface profiles in prismatic and natural channels. Selected laboratory work. Prerequisite: Engrg 128 or 143. 3 s.h. *Wood*

CE 124. *Fundamentals of Sanitary Engineering.* Elements of descriptive hydrology with particular relevance to water supply and drainage; quantitative physical, chemical, and bacteriological characterization of water and waste-waters; introduction to water treatment processes, and wastewater treatment and disposal systems; elements of environmental sanitation including land, water, and air considerations. Laboratory included. Prerequisite: Chem 2. 3 s.h. *Bryan*

CE 126.* *Sanitary Engineering Design.* Design of facilities for providing an adequate supply of water and means for treatment and disposal of wastes. Stream sanitation as it affects location and design of treatment works. Prerequisites: CE 123 and 124. 3 s.h. *Bryan*

CE 131. *Structural Mechanics I.* Shears, moments, and internal forces by algebraic and graphic methods under various conditions of loading. Deflection of trusses. Prerequisite: Engrg 107. 3 s.h. (Not offered after 1966-67.) *Brown*

CE 131. *Structural Mechanics I.* A unified treatment of the methods of analysis of statically determinant and indeterminant structural systems. Serves as an introduction to the process of applying the engineering method to the creation of structures. Prerequisites: Engrg 73 and Math 64. 3 s.h.

CE 132. *Structural Design.* Tension, compression, flexural members, eccentric connections, unsymmetrical bending, riveted and welded plate girders, trusses and office building frames. Timber design using ring con-

*Offered only upon sufficient demand; enrollment limited.

nectors. Design and detail drawings. Prerequisite: CE 131. 4 s.h. (Not offered after 1967-68.) *Palmer*

CE 133. Reinforced Concrete. Theory and design of reinforced concrete beams, columns and footings. Moment distribution. Prerequisite: CE 131. 3 s.h. (Not offered after 1966-67.) *Palmer*

CE 133. Structural Design I. Non-homogeneous materials. Theory and design of compression and flexural members. Emphasis on ultimate strength theory for concrete. Timber connections. Selected design problems in concrete to include forms and timber supports. Prerequisite: Engrg 73. Concurrent CE 131. 3 s.h.

CE 134. Structural Design II. Design in metals, primarily steel. Tension, compression, and flexural members. Riveted, bolted, and welded connections, including eccentric connections. Built-up members. Design by elastic and plastic methods. Selected problems to include computations and drawings. Prerequisite: CE 131. 3 s.h.

CE 135. Introduction to Soil Mechanics. Origin and composition of soils, soil structure. Flow of water through soils; capillary and osmotic phenomena. Soil behavior under stress; compressibility, shear strength. Elements of mechanics of soil masses with application to problems of bearing capacity of foundations, earth pressure on retaining walls, and stability of slopes. Prerequisites: Engrg 107, 109, and 128. Concurrent: CE 101. 2 s.h. (Not offered after 1967-68.) *Vesić*

CE 139. Introduction to Soil Mechanics. Origin and composition of soils; soil structure. Flow of water through soils; capillary and osmotic phenomena. Soil behavior under stress; compressibility, shear strength. Elements of mechanics of soil masses with application to problems of bearing capacity of foundations, earth pressure on retaining walls, and stability of slopes. Laboratory included. Prerequisites: Engrg 73, Engrg 83, and CE 123. 3 s.h.

CE 140.* Structural Mechanics II. Analysis of statically indeterminate structures by various methods including those of elastic energy. Prerequisite: CE 131. 3 s.h. *Barton*

CE 143, 144.* Projects in Civil Engineering. These courses may be assigned by the Chairman of the Department to certain seniors who have shown an aptitude for research, in which case they may be substituted for certain civil engineering courses. 3-6 s.h. *Staff*

CE 146. Professional Engineering. Topics related to the practice of civil engineering: engineering economy, contracts, specifications, and ethics. Presentation of student papers on historical and current aspects of civil engineering. Seniors only. 2 s.h. (Not offered after 1967-68.) *Palmer*

CE 148.* Structural Engineering. Structural design utilizing metals, concrete and timber. Planning, preliminary design, organization of design procedures and specifications. Prerequisites: CE 132 and CE 133. 3 s.h. *Palmer*

*Offered only upon sufficient demand; enrollment limited.

CE 150. *Engineering Systems Analysis.* Systems approach to engineering design, and operation problems. Emphasis on linearized models and linear programming. Deterministic models, critical path scheduling, optimization techniques and their application to engineering problems. Prerequisite: Senior standing. 2 s.h.

Graduate Courses

Professor Brown, *Chairman and Director of Graduate Studies*; Professors Abeles, Bryan, Meriam, and Vesic; Associate Professors Hill and Kumar; Assistant Professors Barton, Harrawood, and Wood

CE 201. *Advanced Mechanics of Materials.* Analysis of structural elements described by ordinary differential equations, such as beams on an elastic foundation, curved beams, beam-columns, circular plates; introduction to plates and shells; energy principles and their use in structural analysis. 3 units. *Hill*

CE 202. *Experimental Stress Analysis.* The experimental analysis of stress and strain in deformable bodies, correlation of theory with data from experiments; photoelasticity; strain gauges; dimensional analysis and similitude principles of models. 3 units. *Hill*

CE 205. *Applied Elasticity.* Introduction to linear theory of elasticity; solutions of two-dimensional problems; three-dimensional problems of torsion and bending; stress concentrations; energy and variational principles with applications to design. 3 units. *Meriam*

CE 211. *Mechanical Behavior of Materials.* Macroscopic mechanical properties of materials for static, fatigue, dynamic and creep conditions; impact, shock, and stress wave properties; temperature, creep, viscoelastic and relaxation properties. 3 units. *Kumar*

CE 212. *Structural Materials.* Elasticity and plasticity as related to rheology; natural and synthetic materials; reinforced materials; composites. 3 units. *Kumar*

CE 221. *Incompressible Fluid Flow.* Steady and unsteady pipe flow, theories of turbulent flow; water hammer theory and control; surge tanks; air chambers; the analysis and control of fluid systems; effect of resistance; tapered conductors. 3 units. *Wood*

CE 231. *Structural Engineering.* The application of the fundamental theories of structural action to the design and analysis of structural members; specifications. 3 units. *Brown*

CE 232. *Reinforced Concrete Design.* Design and analysis of reinforced concrete members including the influence of shrinkage and plastic flow; bond and diagonal tension; prestressed concrete members. 3 units. *Brown*

CE 235. *Foundation Engineering.* An introduction to methods of analysis, design and construction of foundations. Bearing capacity and settlement of shallow and deep foundations. Soil exploration; excavation

and bracing; drainage and stabilization; underpinning. Foundation vibrations. 3 units. *Vesic*

CE 243, 244. Sanitary Engineering Unit Operations and Process Design. Fundamental bases for design of water and waste treatment systems, including transport, mixing, sedimentation and filtration, gas transfer, coagulation, and bio-treatment processes. 6 units. *Bryan*

CE 250. Engineering Analysis. General concepts of the solutions of engineering problems with special emphasis on digital and analog computer and numerical methods; deflection and stability; torsion of non-circular beams and multicelled thin-walled structures; vibrations of beams and membranes; structures with both uniform and nonuniform properties and with rigid and nonrigid supports. 3 units. *Barton and Wood*

CE 302. Theory of Plates and Shells. Analysis of stresses and deformation of plates; vibrations of plates; membrane stress systems in shells; cylindrical shell analysis; bending stresses in shells. Prerequisite: CE 201 or CE 205, or equivalent. 3 units. *Hill*

CE 321. Mechanics of Ideal Fluids. Basic equations of ideal fluid flow; potential and stream functions; vortex dynamics; body forces due to flow fluids; methods of singularities in two-dimensional flows; analytical determination of potential functions; conformal transformations; free-streamline flows. Prerequisite: Math 285, 286, or equivalent. 3 units. *Harrawood and Wood*

CE 322. Mechanics of Viscous Fluids. Equations of motion of a viscous fluid; general properties and selected solutions of the Navier-Stokes equations; boundary layer equations with selected approximate solutions; laminar boundary layers in axisymmetric and three-dimensional flows; unsteady laminar boundary layers. Prerequisites: Math 285 and 286. 3 units. *Harrawood*

CE 331, 332. Advanced Structural Design and Analysis. Analytical and behavior concepts of structural components as related to the design of structural systems; classical methods; numerical and approximate techniques; behavior of structural elements under static and dynamic loading; buckling behavior. Prerequisite: CE 231 or equivalent. 6 units. *Barton*

CE 335. Mechanical Behavior of Soils. Origin of soils, soil minerals and processes of soil formation; physical chemistry of multiphase systems and soil structure. Elements of soil stabilization; permeability and flow of water through soils: capillary and osmotic phenomena; seepage problems; soil compressibility; theory of consolidation; shear strength and failure criteria. Stress-strain relationships, volume changes and pore pressures during shear, strength properties. Advanced laboratory soil testing techniques. 4 units. *Vesic*

CE 336. Advanced Soil Mechanics. Theories of plastic and elastic equilibrium of soil masses and their application to analysis of problems such as: pressure on retaining walls, anchored bulkheads, cofferdams, silos, shafts, tunnels; stability of slopes and earth dams; stresses and settle-

ment in soil masses and pavements, piles and pile groups subjected to lateral loads; elements of soil dynamics. Prerequisite: CE 335. 4 units. *Vesic*

CE 365. *Advanced Topics in Civil Engineering.* Opportunity for study of advanced subjects relating to programs within the Civil Engineering Department tailored to fit the requirements of a small group. 1 to 3 units. *Members of the Graduate Staff*

Electrical Engineering

Undergraduate Courses

Professor Wilson, *Chairman*; Professor Meier, *Director of Undergraduate Studies*

EE 53. *Electrical Engineering Fundamentals.* Survey of electrical engineering profession; role of engineering and professional engineering societies in national life; engineering economy; engineering law; technical engineering problems; basic philosophy of engineering education; introduction of staff, curriculum, and facilities of Department of Electrical Engineering. One two-hour session. 1 s.h. (Not offered after 1965-66.) *Kraybill and Meier*

EE 55. *Electric Networks I.* Physical nature of circuit parameters and sources of excitation; volt-ampere relations for circuit elements; network topology; network equations using loop currents and node voltages; solutions of network differential equations by classical and transform methods. Concurrent: Math 63 and Phys 41. Three class sessions and one two-hour computation. 4 s.h. (Not offered after 1965-66.) *George and Hacker*

EE 56. *Electric Networks II.* Network impedance and admittance functions; steady-state response to sinusoidal forcing; Fourier series analysis; pole-zero analysis of networks; matrices in network analysis; introduction to synthesis of reactance networks. Prerequisite: EE 55. Concurrent: Math 64. Three class sessions and one two-hour computation. 4 s.h. (Not offered after 1965-66.) *George and Hacker*

EE 109-110. *Electromagnetic Systems.* Mathematical and physical consideration of energy relations and forces associated with both discrete particles and materials in electromagnetic fields: vector notation; Maxwell's equations; static and quasi-static fields; energy, power flow, and impedance; particle ballistics; electron emission; control of conduction in vacuums, gases, liquids, and solids; resistance, capacitance, and inductance of systems of conductors; forces between relatively moving bodies; dielectric and magnetic material. Prerequisite: EE 56. Concurrent: Math 111. Three class sessions and one two-hour computation 8 s.h. (Not offered after 1966-67.) *Artley and Vail*

EE 111-112. *Electrical Principles Laboratory.* Instruction in electrical laboratory techniques; experimental study of basic principles of electromagnetics, electronics, and electric and magnetic circuits. Prerequisite: EE 56. Concurrent: EE 109-110. Two three-hour laboratory periods throughout first semester; one throughout second semester. 3 s.h. (Not offered after 1966-67.) *Barnes, Frekko, and Plumer*

EE 123. *Fundamentals of Electrical Engineering.* Introductory treatment of electrical engineering fundamentals for students majoring in other branches of engineering; principles of electric circuits, fields, and electronics. Prerequisites: Math 63 and Phys 42. Concurrent: EE 125. Three class sessions. 3 s.h. *Kerr, Meier, and Trickey*

EE 124. *Industrial Electrical Engineering.* Introductory treatment of industrial applications of electrical engineering fundamentals for students majoring in other branches of engineering; alternating- and direct-current machinery; electronic and electromagnetic control systems; illumination principles. Prerequisite: EE 123. Concurrent: EE 126. Three class sessions. 3 s.h. *Kerr and Trickey*

EE 125. *Electrical Fundamentals Laboratory.* Laboratory course paralleling course EE 123, with which it should be taken concurrently. One three-hour laboratory. 1 s.h. *Bumgardner and Plumer*

EE 126. *Industrial Electrical Laboratory.* Laboratory course paralleling course EE 124, with which it should be taken concurrently. One three-hour laboratory. 1 s.h. *Bumgardner and Plumer*

EE 127.* *Electronics for Engineers.* Introductory treatment of principles and applications of engineering electronics for students majoring in other branches of engineering; amplifiers; feedback; basic communications and control circuits; electronic computers. Prerequisite: EE 123 and permission of instructor. Three class sessions. 3 s.h. *Staff*

EE 159.* *Transmission.* Development of theory underlying transmission of electric energy over conductors at both power and communication frequencies. Two class sessions and one two-hour computation. Prerequisite: EE 110 and Math 111. Elective for electrical majors. 3 s.h. *Staff*

EE 161. *Electronics and Signals.* Techniques for the analysis and design of electronic circuits with emphasis on graphical and piece-wise-linear methods; applications of these methods to particular circuits, including transistor and tube amplifiers, oscillators and switching circuits. Introduction to amplitude-, frequency-, and pulse-modulation systems. Prerequisite: Engrg 113. Two class sessions and one computation or laboratory session. 3 s.h. *Staff*

EE 162. *Electromechanical Energy Conversion.* Principles of energy storage and conversion utilizing magnetic and electric fields; analytical treatment of dynamic equations of motion, including the Euler-Lagrange approach; applications to the design of electromechanical transducers

*Offered only upon sufficient demand; enrollment limited.

and rotating machines. Prerequisites: Engrg 113, 123, and 163. Two class sessions. 2 s.h. *Staff*

EE 163. *Physical Electronics.* Study of physical processes under the influence of electric, magnetic, thermal, and stress fields with contemporary electrical engineering applications: e.g., transistors, thermoelectric energy converters, and magnetic devices. Prerequisites: Engrg 163 and Phys 161. Corequisite: EE 164. Two class sessions and one computation or laboratory. 3 s.h. *Staff*

EE 164. *Electromagnetic Fields and Waves.* Electric and magnetic fields; Maxwell's equations developed from Coulomb's, Ampere's and Faraday's laws and the solenoidal nature of the magnetic field; electrostatics; magnetostatics; quasi-static and stationary fields; electromagnetic waves; retarded potential; relaxation time, reflection, polarization, and radiation of electromagnetic waves; transmission lines; probability waves in periodic structures. Prerequisite: Engrg 163. Two class sessions and one computation or laboratory. 3 s.h. *Staff*

EE 165-166. *Electrical Engineering Seminar.* A course which provides an opportunity to consider matters related to the professional practice of electrical engineering; to relate the undergraduate program of studies to current practice; and to improve the ability to communicate more effectively, both in verbal and written form, particularly with regard to technical material. One class session. 2 s.h. (Not offered after 1967-68.) *Staff*

EE 167. *Design Colloquium.* A course planned to guide the student in learning how the fundamental principles studied in the academic program are translated into the realities of engineering practice. The vehicle will be an extensive and intensive study of a significant modern engineering project. Extensive reference to published information and possible site visits to the projects will be part of the mode of operation, as will written and oral reports. 2 s.h. *Staff*

EE 173-174.° *Projects in Electrical Engineering.* A course which may be undertaken only by seniors who show special aptitude, or who may have had previous experience directly related to the proposed project. The consent of the Chairman of the Department must be obtained before registering. Elective for electrical majors. 3-6 s.h. *Staff*

EE 177.° *Energy Transmission and Radiation.* A more advanced treatment of electromagnetic theory than is afforded by EE 109-110, with particular application to wave guides and antennas. Prerequisite: EE 110 and permission of instructor. Three class sessions. 3 s.h. *Artley*

EE 179.° *Advanced Electrical Measurements.* Theory and practice of measurements of electrical quantities at extremes of voltage, current, power, and frequency. Two class sessions and one three-hour laboratory. Prerequisite: EE 110 and permission of instructor. 3 s.h. *Owen*

°Offered only upon sufficient demand; enrollment limited.

EE 181-182. *Electronic Networks.* Advanced topics in engineering electronics: piece-wise linear approximation for nonlinear operation and incremental models for linear operation of basic electronic circuits; narrow- and wide-band amplifiers; feedback amplifiers; oscillators; modulation and demodulation; microwave devices; communication systems. Prerequisite: EE 110. Concurrent: EE 183-184. Three class sessions. 6 s.h. (Not offered after 1967-68.) *George and Owen*

EE 183-184. *Electronics Laboratory.* Laboratory course paralleling and integrated with course EE 181-182, with which it should be taken concurrently. One three-hour laboratory. 2 s.h. (Not offered after 1967-68.) *Feng and Rechten*

EE 191-192. *Electric Machinery.* Application of circuit and field principles to underlying theory of static and rotating electric machinery; mathematical techniques for analyzing transformers and electromechanical energy converters as individual devices and when interconnected into systems. Prerequisite: EE 110. Concurrent: EE 193-194. Three class sessions. 6 s.h. (Not offered after 1967-68.) *Meier and Trickey*

EE 193-194. *Energy Conversion Laboratory.* Selected experiments in energy conversion combining the theory and practice of transformers, electro-mechanical devices including motors and generators, photovoltaic sources, thermo-electric generators, static d-c to a-c and d-c to d-c converters. Prerequisite: EE 112. Concurrent: EE 191-192. 2 s.h. (Not offered after 1967-68.) *Bumgardner, Trickey, and Rechten*

EE 195.^o *Nuclear Engineering Fundamentals.* Review of nuclear physics; fission and the chain reaction; nuclear reactor principles and concepts; materials, instrumentation, and control of nuclear reactor; selected topics in nuclear engineering. Prerequisite: permission of instructor. 3 s.h. *Meier and Wortman*

EE 197. *Solid-State Materials.* Prediction and explanation of the response of ferroelectric, ferromagnetic, ferrimagnetic, and semiconductor materials to thermal, electric, magnetic and stress fields. Exploration of possibilities of improving the materials. Two class sessions and one three-hour laboratory. Prerequisites: Math 111 and one course from among Phys 161, EE 110, CE 118, and ME 59. 3 s.h. *Pilkington*

EE 199.^o *Linear Feedback Systems.* Analysis and design of linear; continuous-data feedback control systems; stability tests; time and frequency domain methods; root locus method; performance specifications; study of electrical, mechanical, hydraulic, aerodynamic, pneumatic, and thermal systems. Two class sessions and one three-hour laboratory. Prerequisite: permission of instructor. 3 s.h. *Wells*

Graduate Courses

Professor Wilson, *Chairman*; Professor Owen, *Director of Graduate*

^oOffered only upon sufficient demand; enrollment limited.

Studies; Professors Artley, Meier, and Vail; Associate Professors Burger (Adjunct), Kerr, and Wells; Assistant Professors George, Hacker, and Pilkington; Lecturers Hampikian (Visiting) and Trickey

EE 201. *Energy Systems.* Application of general energy concepts to specific engineering devices and systems; use of mathematical models to describe concepts of energy storage, transfer, transformation, and control that are applicable to electromagnetic, mechanical, fluid, and thermal systems; the Lagrangian, Hamiltonian formulation, and tensors. Prerequisite: permission of instructor. 3 units. *Artley*

EE 203, 204. *Information Systems.* General concepts of information storage, transfer, and processing; information theory, coding, noise theory, and response of information-handling systems in the time and frequency domains. Applications of information concepts to specific engineering situations: modulation, sampling, optimum filtering, detection in presence of noise, and comparisons of various systems. Prerequisite: permission of instructor. 6 units. *Owen, Kerr, and George*

EE 207.* *Network Synthesis.* Linear network theory, including a review of time and frequency domain analysis; network graphs; network functions and realizability conditions; driving point impedance synthesis of passive networks; driving point and transfer specifications; approximation methods. Prerequisite: permission of instructor. 3 units. *Owen and Vail*

EE 211. *Solid-State Theory.* The fundamental theory of wave motion in solids, including wave mechanics; variational method; perturbation theory; many-electron problems; one-electron approximation; free-electron approximation; electron spin; Brillouin zones; time-dependent Schrodinger's equation; and transition probabilities. Introduction to the thermodynamics of solids, including Maxwell-Boltzmann, Bose-Einstein, and Fermi-Dirac statistics; ensembles; entropy; and free-energy functions. Prerequisite: permission of instructor. 3 units. *Artley, Burger, Hacker, Pilkington, and Vail*

EE 212. *Solid-State Materials.* Concepts of solid state physics as applied to engineering materials: electrical, magnetic, thermal, and mechanical properties of solids; dielectrics; ferroelectrics; semiconductors; magnetic materials; and superconductors. Prerequisite: EE 211. 3 units *Artley, Burger, Hacker, Pilkington, and Vail*

EE 222. *Nonlinear Analysis.* Introduction to methods of analyzing engineering systems described by nonlinear differential equations: analytic, numerical, graphical, and series approximation methods; analysis of singular points; stability of nonlinear systems. Application of various methods, such as the modified Euler, Runge-Kutta, isoclines, perturbation, reversion, variation of parameters, residuals, harmonic balance, Bendixon, and Liapounov to phenomena of nonlinear resonance, subharmonics, relaxation oscillations, and forced oscillating systems. Prerequisite: permission of instructor. 3 units. *Wilson*

*Offered only upon sufficient demand; enrollment limited.

EE 231.* Nuclear Engineering. Review of nuclear physics; fission and the chain reaction; nuclear reactor principles; materials, instrumentation, and control of nuclear reactors; selected applications and techniques of nuclear engineering. Prerequisite: permission of instructor. 3 units. *Meier*

EE 241.* Feedback Control Systems. Analysis and design of linear sampled-data systems; linear systems subjected to random inputs; analytical design using mean square error and integral square error criteria; non-stationary and nonlinear systems. Prerequisite: permission of instructor. 3 units. *Wells and Wilson*

EE 259.* Advanced Electric Energy Conversion. Equations of motion of electromechanical systems, fields and lumped parameters, state function concepts; mathematical techniques for analyzing electromechanical devices and systems; transducers; unified treatment employing matrix, tensor, and block-diagram concepts to obtain response under static and dynamic conditions; the generalized rotating machine. Prerequisite: permission of instructor. 3 units. *Meier, Trickey, and Wilson*

EE 265.* Advanced Topics in Electrical Engineering. Opportunity for study of advanced subjects related to programs within the electrical engineering department tailored to fit the requirements of a small group. Prerequisite: approval of the Director of Graduate Studies and of instructor under whom work will be done. 1 to 3 units. *Members of the Graduate Staff*

EE 271. Electromagnetic Theory. The classical theory of Maxwell's equations; electrostatics; magnetostatics; boundary value problems, including numerical solutions; currents and their interactions; and force and energy relations. Prerequisite: permission of instructor. 3 units. *Artley, Hacker, and Pilkington*

EE 272. Applications of Electromagnetic Theory. Propagation of plane, spherical, and guided electromagnetic waves; cavities; propagation in anisotropic media; network representation of microwave structures; and measurement techniques. Selected laboratory work. Prerequisite: EE 271 or permission of instructor. 3 units. *Artley, George, and Hacker*

EE 311. Quantum Theory in the Engineering of Materials. Concepts of the quantum theory of solids as applied to the molecular design of engineering materials. Topics selected will vary somewhat with the interests of the class, but the importance of quantized fields in crystals (phonons, magnons, plasmons, excitons, and polarons) and the interaction of these fields will be stressed. Prerequisites: EE 212 and Phys 316. 3 units. *Pilkington*

EE 313.* Magnetism. A study of ferromagnetic and ferrimagnetic materials, including effects of thermal conditions and treatment, mechanical stress, magnetic field intensity, crystal structure, and macroscopic

*Offered only upon sufficient demand; enrollment limited.

geometry. Study emphasizes relationships of fundamental concepts of engineering interest. Prerequisite: EE 211 or equivalent. 3 units. *Artley, Hacker, and Wilson*

EE 315, 316.* *Solid-State Devices.* Study of terminal parameters and functional characteristics of electronic devices in terms of the properties and structural configurations of their constituent materials. First semester emphasis on such semiconductor devices as transistors and on integrated semiconductor circuits; second semester emphasis on other types of solid-state devices. Prerequisite: permission of instructor. 6 units. *Burger, Hampikian, and Pilkington*

EE 321. *Nonlinear Electromagnetics.* Mathematical description of nonlinear magnetic and semiconductor characteristics; transient and steady-state analysis and synthesis of nonlinear systems with application to such topics as magnetic amplifiers, frequency converters, oscillators, computer logic, and switching devices. Prerequisite: permission of instructor. 3 units. *Wilson*

EE 342. *Optimum Control Systems.* Use of variational methods in control system design; classical calculus of variations; dynamic programming; Pontriagin's maximum principle; computer applications in control. Prerequisite: permission of instructor. 3 units. *Kerr*

EE 343. *Nonlinear Control Systems.* Analysis and design of nonlinear feedback control systems; approximations for small and for large disturbances; phase-plane analysis; describing-function techniques; relay servomechanisms, optimum and quasi-optimum performance; nonlinear compensation. Prerequisite: permission of instructor. 3 units. *Kerr, Wells, and Wilson*

EE 399.* *Special Readings in Electrical Engineering.* Special individual readings in a specified area of study in electrical engineering. Prerequisite: approval of the Director of Graduate Studies. 1 to 3 units. *Members of the Graduate Staff*

Mechanical Engineering

Undergraduate Courses

Professor, Kenyon, *Acting Chairman and Director of Undergraduate Studies*

ME 52. *Kinematics, Kinetics.* Analytical and graphical studies of displacement, velocity, and acceleration in mechanical elements and systems. Synthesis and analysis of mechanisms for machines. Prerequisite: Engrg 2. Concurrent: Math 63, Phys 41. 3 s.h. (Not offered after 1965-66.) *Nash*

*Offered only upon sufficient demand; enrollment limited.

ME 59. *Materials and Processes.* Elementary metallurgy and introduction to modern theories of the solid state; selection and properties of engineering materials and effect of forming processes upon properties. Prerequisite: Chem. 2. 3 s.h. (Not offered after 1967-68.) *Pearsall*

ME 101-102. *Engineering Thermodynamics.* A basic study of the laws of thermodynamics and their use in engineering analysis and design. Properties of pure substances; vapor cycles; fluid flow; thermodynamic machinery; introduction to combustion processes. Prerequisites: Chem 1 and Phys 42. Concurrent: Math 64. 6 s.h. (Not offered after 1966-67) *Boyle, Harman, and Kenyon*

ME 102. *Thermodynamics II.* A basic study of various thermodynamics phenomena and their use in engineering analysis and design. Examination of the dynamic properties and phenomena from macroscopic and microscopic points of view. Prerequisite: E 101. 3 s.h. (Beginning 1967-68.)

ME 103. *Thermodynamics.* A terminal course in thermodynamics and its engineering applications for civil and electrical engineering students. The basic laws of thermodynamics; gases; vapors; elements of combustion and heat transfer. Prerequisite: Chem 1 and Phys 42. Concurrent: Math 64. 3 s.h. (Not offered after 1966-67). *Elsevier*

ME 105. *Dynamics of Fluids.* A study of liquids at rest and in motion. Principles of laminar and turbulent flow through pipes, orifices, nozzles, and metering devices; impulse and momentum concepts; vortex action, pumps, turbines and fluid couplings; resistance of immersed and floating bodies. Prerequisite: Phys 41 and Math 63. 3 s.h. (Not offered after 1965-66.) *Buzzard*

ME 106. *Heat Transfer.* A basic course covering the elements of radiation, conduction, and convection. Methods of temperature measurement, steady and transient heat flow, analytical and numerical methods. Concurrent: ME 102, 105 and Math 64. 3 s.h. (Not offered after 1966-67.) *Buzzard*

ME 114. *Junior Mechanical Engineering Laboratory.* Measurement of mechanical and thermodynamic properties of systems. Student planning and reporting of laboratory experiments in temperature, pressure, velocity, acceleration, flow, energy and power measurements. Concurrent: ME 101-102, 105, and 106. 2 s.h. (Not offered after 1966-67.) *Staff*

ME 116. *Mechanical Engineering Laboratory.* Primarily for civil and electrical engineering students. Selected laboratory experiments in measuring mechanical and thermodynamic properties of systems. Student planning of experiments in temperature, pressure, velocity, acceleration, flow, energy and power measurements. Concurrent: ME 103. 1 s.h. (Not offered after 1966-67.) *Staff*

ME 128.* *Dynamics of Gases.* The flow of compressible fluids at high velocities. One-dimensional compressible flow: area change; normal

*Offered only upon sufficient demand; enrollment limited.

shock; friction and heat transfer; Mach number. Prerequisite: ME 102. Concurrent: ME 106. 3 s.h. *Buzzard*

ME 133. Mechanical Design I. Study of the geometry of mechanisms with regard to the motions obtained; introduction to toothed gearing, cams, linkages, and intermittent motion devices. Kinematics and kinetics of linkages; the instant center; velocity, acceleration, and inertia force polygons. Prerequisite: Math 63. Concurrent: E 123. Two class sessions and one computation or laboratory session. 3 s.h.

ME 134. Mechanical Design II. Application of kinematic and kinetic analyses to practical problems in the design of machine elements. Study of stress, deflection, materials and factors of safety as related to specific function and shape of machine elements. Two class sessions per week. Prerequisite: Mechanical Design I. 2 s.h.

ME 136. Response of Systems. System design for optimum dynamic response. Instrumentation and development of mathematical models from physical systems; operational and computer techniques; matrix methods for lumped and distributed systems; introduction to nonlinear phenomena. Concurrent: Math 111. Two class sessions and one computation or laboratory session. 3 s.h.

ME 141. Machine Design. Elements of mechanism with special attention to the role of invention in mechanical design. Velocity and acceleration in mechanisms from both scalar and vector viewpoints. Prerequisite: Math 63. Concurrent: ME 52 and E 57 or 60. 3 s.h. (Not offered after 1966-67.) *Djordjevic and Linderoth*

ME 142. Machine Design. Continuation of ME 141. Static and dynamic forces in machinery. The instant center; theory of gear tooth profiles. Design of machine elements, such as gears, springs, and bearings; complex parts. Prerequisite: ME 141. Concurrent E 107. 3 s.h. (Not offered after 1966-67.) *Djordjevic and Linderoth*

ME 153.* Heating, Air Conditioning and Refrigeration. Principles of thermodynamics, heat transfer and fluid flow applied to comfort and industrial air conditioning. Cycles and equipment for heating, cooling, and humidity control. Air transmission and distribution. Modern vapor compression, absorption and low temperature refrigeration cycles and systems. Prerequisite: ME 102 and 106. 3 s.h. *Elsevier*

ME 156. Combustion Engines. A study of cycles, fuels, and fuel mixtures in piston, ram jet, and rocket engines. Comparison of real and theoretical cycles; carburetion and fuel injection systems; modern development. Prerequisite: ME 102. 3 s.h. (Not offered after 1967-68.) *Elsevier*

ME 157.* Pumps, Compressors and Turbines. An introduction to the theory and design of centrifugal pumps and compressors, axial-flow compressors, impulse and reaction turbines, and gas turbine plants, combustors.

*Offered only upon sufficient demand; enrollment limited.

tion systems and regenerators. Concurrent: ME 102 and 106. 3 s.h. *Boyle*

ME 159-160. Senior Mechanical Engineering Laboratory. Laboratory determination of heat flow and operating characteristics of engines, fans, pumps, and other power and refrigeration plant components; vibrational systems, control systems, analog methods. Student planning and reporting of original experiments. 2 s.h. (Not offered after 1967-68.) *Staff*

ME 161. Mechanical Engineering Laboratory. Laboratory experience designed to involve the student in real engineering problems and to reinforce his understanding of some of the basic principles in the areas of thermodynamics, systems response, heat transfer and fluid mechanics. One class session and one three-hour laboratory session each week. Prerequisite: senior standing. 2 s.h.

ME 162. Power Plants. Basic concepts of thermodynamics, heat transfer and fluid flow are combined with industrial data for the consideration of real power plant problems. Selection of steam generators, prime movers, fans, pumps, heaters, and piping systems with regard to engineering and economic points of view. Prerequisite: ME 102. 3 s.h. (Not offered after 1967-68.) *Harman*

ME 163.* Vibration Control. An introduction to the dynamics of mechanical systems; equilibrium, stability, lumped and distributed systems, cradle and field balancing. System analysis by classical differential equations, mechanical impedance, operational calculus and analog simulation. Prerequisite: Math 64 and ME 141. 3 s.h. *Macduff*

ME 164.* Engineering Analysis. A study of a series of engineering problems with particular reference to mathematical and graphical methods of solution and engineering interpretations of results. Concurrent: Math 64. 3 s.h. *Boyle*

ME 166.* Air Conditioning Design. Typical air conditioning systems considered in relation to specific problems. Equipment analysis and performance, economic considerations, system control and response, noise generation and attenuation. Prerequisite: ME 153. 3 s.h. *Elsevier*

ME 167.* Industrial Engineering. A study of the organization and functioning of industries; function of engineering in industry; job analysis and self evaluation; professional and executive responsibility of the mechanical engineer. Prerequisite: senior standing. 3 s.h. *Lewis*

ME 168.* Industrial Engineering Production Methods. Study of engineering theory, methods and controls in production. Methods, motion and time study, plant lay-out, production and quality control, industrial safety, operations research. Prerequisite: senior standing, ME 167 or equivalent. 3 s.h. *Lewis*

ME 171. Response of Physical Systems. An introduction to the basic fundamentals of instrumentation and of the control of processes and sys-

*Offered only upon sufficient demand; enrollment limited.

tems with emphasis on correlation of analysis and experimental results. Concurrent: Math 111. 3 s.h. *Macduff*

ME 173-174. *Mechanical Engineering Seminar.* A course designed to keep the students abreast of progress in the engineering field and to develop their ability to express ideas effectively in speech and writing. Open to seniors only. 2 s.h. (Not offered after 1967-68.) *Staff*

ME 182.* *Fundamentals of Nuclear Engineering.* Review of nuclear physics, nuclear interactions and cross sections, neutron induced chain reactions, shielding, hazards, isotope utilizations, reactor systems, and power reactors. Prerequisite: permission of instructor. 3 s.h. *Kenyon*

ME 197-198. *Projects in Mechanical Engineering.* This course may be assigned by the Chairman of the Department to outstanding seniors who express a desire for such work and who have shown aptitude for research in one distinct field of mechanical engineering. Prerequisite: 3.0 average and senior standing. 1-6 s.h. *Staff*

Graduate Courses

Professor Kenyon, *Acting Chairman and Director of Graduate Studies*; Professors Linderoth, Macduff, and Meriam; Associate Professors Boyle, Elsevier, Harman, and Pearsall; Assistant Professor Buzzard

ME 201.* *Theoretical and Applied Mechanics.* Introduction to the theory of elasticity, and vibration analysis. 3 units. *Meriam*

ME 202.* *Theoretical Thermodynamics.* Classical thermodynamics based on the First, Second, and Third Laws of Thermodynamics. Classical and statistical thermodynamics of ideal gases. Properties of real gases, equilibrium, combustion, and irreversible processes. 3 units. *Harman*

ME 221.* *Analysis of Compressible Fluid Flow.* Flow of compressible fluids; concepts of subsonic, sonic, and supersonic flow; experimental methods. 3 units. *Harman*

ME 222.* *Analysis of Heat Transfer.* Heat transfer by conduction, convection, and radiation; lumped and distributed heat capacity, resistance, losses; steady and transient flow. 3 units. *Buzzard*

ME 231-232.* *Systems Engineering.* Methods of obtaining parameters for strength, response, and stability studies of mechanical systems. Impedance and operational means of analysis; mechanical and electronic analogs; nonlinear theories. 6 units. *Macduff*

ME 265.* *Advanced Topics in Mechanical Engineering.* Opportunity for study of advanced subjects related to programs within mechanical engineering tailored to fit the requirements of a small group. Prerequisite: approval of the Director of Graduate Studies and of instructor under whom work will be done. 1 to 3 units. *Members of the Graduate Staff*

ME 280.* *Nuclear Reactor Power Cycles.* Introduction to basic reactor

*Offered only upon sufficient demand; enrollment limited.

principles and reactor types. Consideration of thermodynamic cycles for nuclear reactors for stationary and mobile plants. Analysis of fluid flow and heat transfer problems unique to reactors with development of methods of reactor safety techniques. Metallurgical problems peculiar to reactor design. 3 units. *Kenyon*

Non-Engineering Subjects in Curricula

Chem 1, 2. *General Inorganic Chemistry.* Lectures and recitations on the elementary principles of chemistry and on the structure, properties, preparation and uses of the elements and their compounds. The laboratory work includes qualitative analysis of some of the more common metals. Two lectures, one recitation, and three laboratory hours throughout the year. Chemistry 1 is a prerequisite for Chemistry 2. Prerequisite: Qualification for Math 21. 8 s.h.

Engl 1-2. *Freshman Composition.* Training in composition through the writing of weekly expository themes. The theme subjects derive from assigned reading drawn from British and American literature of the Twentieth Century. English 1 takes up the Essay, the Short Story, and the Novel; English 2, the Play and the Poem. The student attends each week (1) a general lecture on the reading for the week; (2) a section meeting, where the instructor and a small group discuss problems of composition and literature; and (3) an individual conference in which the instructor reads and grades the weekly theme and makes special assignments according to the needs of the student. 6 s.h.

Math 21, 22. *Introductory Calculus.* Real and complex numbers, rectangular and polar coordinates, graphs, trigonometric and inverse trigonometric functions, logarithmic and exponential functions, conic sections, limits, derivatives, maxima and minima, methods of integration, areas, volumes. Prerequisite: three units of college preparatory mathematics. Math 21 is prerequisite for Math 22. 6 s.h.

Math 63, 64. *Intermediate Calculus.* Moments, centroids, indeterminate forms, Taylor's formula, approximation of integrals, improper integrals, infinite series, vectors and solid analytic geometry, partial derivatives, multiple integrals, introduction to ordinary differential equations. Prerequisite: Math 22 for 63; and 63 for 64. 6 s.h.

Math 111. *Applied Mathematical Analysis I.* Ordinary and partial linear differential equations with constant coefficients, Fourier series and their applications, vectors. Not open to students who have had Math 131. Prerequisite: Math 64. 3 s.h.

Math 112. *Applied Mathematical Analysis II.* Complex variables, residues, conformal mapping, matrices, Laplace and Fourier Transforms and their applications. Prerequisite: Math 64. 3 s.h.

Phys 41-42. General Physics. Treats the basic principles of general physics in a more quantitative manner than Physics 1-2. It meets in a thorough way the physics requirement for entrance into the study of either medicine or engineering, and is well suited for the general science student. This course is not open for credit for students who have completed Physics 1-2. Three lecture-recitations and one three-hour laboratory period each week. Prerequisite: Mathematics 21, 22 or equivalent (Mathematics 21, 22 may be taken concurrently). 8 s.h.

Phys 161. Modern Physics. Review of electromagnetic fields, relativity, quantum phenomena, atomic and molecular spectra, solids, and nuclear physics. Three lectures each week. Prerequisites: Phys 41-42 and Math 22. Phys 161 is prerequisite for 162. 6 s.h.

For additional non-engineering courses consult the *Bulletin of Undergraduate Instruction*.

Recommended Minor Subjects for Graduate Students

Chem 206. Elements of Theoretical Chemistry. A one semester course in the principles of physical chemistry. Credit is not given for both 206 and 161-162. Three recitation and three laboratory hours. Prerequisite: Chemistry 70, Physics 41-42, and Mathematics 22. 4 units.

Math 221. Digital Computer. History of computers; number representation, information, storage, logical arithmetic; components and organization of computing systems; coding and programming; programmed arithmetics, function and functional subroutines, interpretive routines, compilers; error analysis. A fee of \$8.00 to provide for materials and clerical services of the Computing Laboratory is charged for this course. The fee is payable to the Treasurer's Office of Duke University at the beginning of the semester. Prerequisite: Mathematics 22. 3 units.

Math 222. Introduction to Numerical Analysis. Error analysis, real and complex roots of equations, finite difference methods and theory of interpolation, numerical differentiation and integration, numerical integration of ordinary and partial differential equations, simultaneous equations and matrix inversion. Prerequisite: Math 221. 3 units.

Math 283. Probability for Engineers. Basic probability concepts, sample space, discrete and continuous events, permutations and combinations, conditional and marginal probability, discrete and continuous distributions, expected values and moments, sampling distributions, estimations, hypothesis testing, confidence intervals, multiple regression, one-way analysis of variance. Prerequisite: Math 64. 3 units.

Math 285. Applied Mathematical Methods I. Vectors, line and surface integrals, tensors, complex variables, differential and integral equations. Prerequisite: Math 64. 3 units.

Math 286. *Applied Mathematical Methods II.* Wave equation, Fourier series, heat equations, telegraphic equation, Legendre polynomials, Bessel functions, Schrödinger's equation. Prerequisite: Math 64. 3 units.

Math 289. *Applications of Stochastic Processes I.* Recurrent events, random walk, Markov chains and processes, queuing theory, branching and diffusion processes. Prerequisite: Math 135 and 140, or consent of instructor. 3 units.

Math 290. *Applications of Stochastic Processes II.* Recurrent events, random walk, Markov chains and processes, queuing theory, branching and diffusion processes. Prerequisite: Math 289 or consent of the instructor. 3 units.

Math 291-292. *Theory of Functions.* Limits, implicit functions, power series, double series, Cauchy's theorem and its applications, residues, Riemann surfaces, conformal mapping. Prerequisite: Mathematics 64 for 291; and 291 for 292. 6 units.

Med 205. *Physiological Models.* Primarily intended for students with some background in electrical engineering. It will cover the following topics: energy transformation and storage in single cells; membrane model circuit diagrams and cable properties; membrane non-linear-current relations; nerve impulse transmission; excitation and inhibition; mechanics and thermodynamics of muscles; electrical analysis of cardiovascular-respiratory systems. 3 units.

Phys 201, 202. *Mechanics.* The fundamental principles of Newtonian mechanics, general dynamics of systems of particles and rigid bodies, the methods of Lagrange and Hamilton; generalized mechanics. 6 units.

Phys 213, 214. *Contemporary Physics.* A course which covers the fundamental concepts and the experimental basis of modern physics. Three lectures each week. 6 units.

Phys 221, 222. *Theoretical Physics.* Mechanics of particles and of rigid bodies, elasticity, fluids dynamics, electrodynamics, optics, relativity, thermodynamics, statistical mechanics, wave mechanics. Prerequisite: Math 285, 286 or equivalent to be taken at least concurrently. 6 units.

For additional courses consult the *Bulletin of The Graduate School of Arts and Sciences*.

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BULLETIN OF DUKE UNIVERSITY

General Catalogue

1966

Part One

Annual Bulletins

For *Bulletin of Information for Prospective Students*, apply to The Registrar, Duke University, Durham, N. C.

For *Bulletin of Undergraduate Instruction*, apply to The Registrar, Duke University, Durham, N. C.

For *Bulletin of The College of Engineering*, apply to The Registrar, Duke University, Durham, N. C.

For *Bulletin of The Divinity School*, apply to The Dean of the Divinity School, Duke University, Durham, N. C.

For *Bulletin of The School of Forestry*, apply to The Dean of the School of Forestry, Duke University, Durham, N. C.

For *Bulletin of The Graduate School of Arts and Sciences*, apply to The Dean of the Graduate School, Duke University, Durham, N. C.

For *Bulletin of The School of Law*, apply to The Dean of the School of Law, Duke University, Durham, N. C.

For *Bulletin of The School of Medicine*, apply to The Dean of the School of Medicine, Duke University, Durham, N. C.

For *Bulletin of The School of Nursing*, apply to The Dean of the School of Nursing, Duke University, Durham, N. C.

For *Bulletin of The Summer Session*, apply to The Director of the Summer Session, Duke University, Durham, N. C.

Published by Duke University monthly except in July, August, September, and December. Entered as second-class matter March 25, 1929, at the Post Office of Durham, North Carolina, under the Act of August 24, 1912.

Statement of Ownership, Management, and Circulation

Date of Filing: June, 1966

Title of Publication: Bulletin of Duke University.

Frequency of Issue: 13 per calendar year.

Location of Known Office of Publication: 111 Allen Building, Duke University, Durham, North Carolina.

Location of the Headquarters or General Business Offices of the Publishers: Same.

Name and Address of Publisher: Duke University, Durham, North Carolina.

Name and Address of Editor: Dr. Richard L. Tuthill, Registrar, Duke University, Durham, North Carolina.

Name and Address of Managing Editor: Mrs. Sandra Simmons, Assistant to the Registrar, Duke University, Durham, North Carolina.

Owner: Duke University, Durham, North Carolina.

Known Bondholders, Mortgages, and Other Security Holders: None.
(Act of October, 1962: Section 4369. Title 39 U.S. Code)

BULLETIN OF DUKE UNIVERSITY

General Catalogue

1966

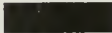
Part One

Durham, North Carolina 1966

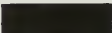
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The Divinity School 

The College of Engineering 

The School of Forestry 

Calendar of the Colleges 1966-1967

September

- 16 Friday, 7:30 p.m.—Orientation begins: Assemblies for all new students entering Trinity College, the Woman's College, and the College of Engineering
- 19 Monday—Registration and matriculation of all students of Trinity College, the Woman's College, and the College of Engineering, who have not pre-registered
- 21 Wednesday, 8:00 p.m.—University Convocation. Indoor Stadium
- 21 Wednesday—Final Registration of pre-registered students
- 22 Thursday, 8:10 a.m.—Fall semester classes begin

November

- 5 Saturday—Last day for reporting six-weeks grades
- 14-17 Pre-registration for Spring Semester 1967
- 23 Wednesday, 12:30 p.m.—Thanksgiving recess begins
- 28 Monday, 8:10 a.m.—Classes are resumed

December

- 20 Tuesday, 12:30 p.m.—Christmas recess begins

January

- 3 Tuesday, 8:10 a.m.—Classes are resumed
- 14 Saturday, 12:30 p.m.—Fall semester classes end
- 17 Tuesday—Final Examinations begin
- 27 Friday—Final Examinations end
- 31 Tuesday—Registration and matriculation of new students

February

- 1 Wednesday—Last day for matriculation for the spring semester
- 2 Thursday—Spring semester classes begin

March

- 15 Wednesday—Last day for reporting six-weeks grades
- 24 Friday, 12:30 p.m.—Spring recess begins

April

- 3 Monday, 8:10 a.m.—Classes are resumed
- 10-13 Pre-registration for Summer Session and Fall Semester 1967

May

- 18 Thursday, 5:00 p.m.—Spring semester classes end
- 20 Saturday—Final examinations begin
- 31 Wednesday—Final examinations end

June

- 3 Saturday—Commencement begins
- 5 Monday—Graduating Exercises

History

Duke University is built about a group of colleges which have their roots deep in the past. It was founded more than one hundred years ago when a number of earnest citizens from Randolph and adjacent counties assembled in a log school house to organize an educational society. They wished to provide lasting support for the local academy founded a few months before by an energetic son of North Carolina, Brantley York.

Moved by "no small share of philanthropy and patriotism," these men set forth their belief "that ignorance and error are the bane not only of religious but also of civil society" and that they "rear up almost an impregnable wall between man and the happiness he so ardently pants after." On that basis they formally adopted a constitution for the Union Institute Society. Thus in February, 1839, the academy became Union Institute. Twelve years later the Institute was reorganized as Trinity College. In 1892 it was moved from the fields of Randolph County to the growing city of Durham. Thirty-two years later the College grew into Duke University. With increasing enrollment and the development of specialized needs, the Woman's College was formed in 1925 and the College of Engineering in 1938.

As the University developed around the core of the colleges, the Graduate School of Arts and Sciences expanded in number of students and in areas of instruction and research; the School of Law of Trinity College became the Duke University School of Law; and other professional schools were established. The Divinity School was organized in 1926, the School of Medicine and the School of Nursing in 1930, and the School of Forestry in 1938.

From academy to university the basic principles have remained constant. The University motto, *Eruditio et Religio*, reflects a fundamental faith in the union of knowledge and religion, the advancement of learning, the defense of scholarship, the love of freedom and truth, a spirit of tolerance, and a rendering of the greatest service to the individual, the state, the nation, and the church. Through changing generations of stu-

dents the objective has been to encourage each individual to achieve to the extent of his capacities an understanding and appreciation of the world in which he lives, his relationship to it, his opportunities, and his responsibilities.

Government

1. The Indenture of Trust by Which the University Was Created

Among the provisions of James B. Duke's Indenture of Trust was an educational institution to be known as Duke University, to the building and support of which he made provision at the time of execution of the Indenture and later by additions thereto by the operation of his Will. In respect to Duke University the Indenture contains the following provisions:

I. (In Article FOURTH) The Trustees hereunder are hereby authorized and directed to expend as soon as reasonably may be not exceeding Six Million Dollars of the corpus of this trust in establishing at a location to be selected by them within the State of North Carolina an institution of learning to be known as Duke University, for such purpose to acquire such land and erect and equip thereon such buildings according to such plans as the Trustees may in their judgment deem necessary and adopt and approve for the purpose to cause to be formed under the laws of such state as the Trustees may select for the purpose a corporation adequately empowered to own and operate such properties under the name of Duke University as an institution of learning according to the true intent hereof, and convey to such corporation when formed the said lands, buildings and equipment upon such terms and conditions as that such corporation may use the same only for such purposes of such universities and upon the same ceasing to be so used then the same shall forthwith revert and belong to the Trustees of this trust as and become a part of the corpus of this trust for all the purposes thereof.

However, should the name of Trinity College, located at Durham, North Carolina, a body politic and incorporate, within three months from the date hereof (or such further time as the Trustees hereof may allow) be changed to Duke University, then, in lieu of the foregoing provisions of this division "FOURTH" of the Indenture as a memorial to his father,

Washington Duke, who spent his life in Durham and whose gifts, together with those of Benjamin N. Duke, the brother of the party of the first part, and of other members of the Duke family, have so largely contributed toward making possible Trinity College at that place, he directs that the Trustees shall expend of the corpus of this trust as soon as reasonably may be a sum not exceeding Six Million Dollars in expanding and extending said University, acquiring and improving such lands, and erecting, removing, remodeling and equipping such buildings, according to such plans, as the Trustees may adopt and approve for such purpose to the end that said Duke University may eventually include Trinity College as its undergraduate department for men, a School of Religious Training, a School for Training Teachers, a School of Chemistry, a Law School, Co-ordinate College for Women, a School of Business Administration, a Graduate School of Arts and Sciences, a Medical School and an Engineering School, as and when funds are available.

II. (In Article FIFTH) Thirty-two per cent of said net amount not retained as aforesaid for addition to the corpus of this trust shall be paid to that Duke University for which expenditures of the corpus of the trust shall have been made by the Trustees under the "Fourth" division of this Indenture so long as its name shall be Duke University and it shall not be operated for private gain, to be utilized by its Board of Trustees, in defraying its administration and operating expenses, increasing and improving its facilities and equipment, the erection and enlargement of buildings and the acquisition of additional acreage for it, adding to its endowment or in such other manner for it as the Board of Trustees of said institution may from time to time deem to be of its best interests, provided that in case such institutions shall incur any expense of liability beyond provisions already in sight to meet same, or in the judgment of the Trustees under this Indenture be not operated in a manner calculated to achieve the results intended hereby the Trustees under this Indenture may withhold the whole or any part of such percentage from said institution so long as such character of expense or liabilities or operation shall continue, such amounts so withheld to be in whole or in part either accumulated and applied to the purposes of such University in any future year or years, or utilized for the other objects of this Indenture, or added to the corpus of this trust for the purpose of increasing the principal of the trust estate, as the Trustees may determine.

III. (In Article SEVENTH) I have selected Duke University as one of the principal objects of this trust because I recognize that education, when conducted along sane and practical, as opposed to dogmatic and theoretical, lines, is, next to religion, the greatest civilizing influence. I request that this institution secure for its officers, trustees, and faculty, men of such outstanding character, ability, and vision as will insure its attaining and maintaining a place of real leadership in the educational

world, and that great care and discrimination be exercised in admitting as students only those whose previous records show a character, determination, and application evincing a wholesome and real ambition for life. And I advise that the courses at this institution be arranged, first, with special reference to the training of preachers, teachers, lawyers and physicians, because these are most in the public eye, and by precept and example can do most to uplift mankind, and second, to instruction in chemistry, economics, and history, especially the lives of the great of earth, because I believe that such subjects will most help to develop our resources, increase our wisdom and promote human happiness.

IV. (In Article THIRD) as respects any year or years and any purpose or purposes for which this trust is created (except the payments hereinafter directed to be made to Duke University) the Trustees in their uncontrolled discretion may withhold the whole or any part of said incomes, revenues and profits which would otherwise be distributed under the "Fifth" division hereof, and either (1) accumulate the whole or any part of the amount so withheld for expenditures (which the Trustees are hereby authorized to make thereof) for the same purpose in any future year or years, or (2) add the whole or any part of the amounts so withheld to the corpus or the trust, or (3) pay, apply and distribute the whole or any part of said amounts to and for the benefit of any one or more of the other purposes of this trust, or (4) pay, apply and distribute the whole or any part of said amounts to or for the benefit of any such like charitable, religious or educational purpose within the State of North Carolina or the State of South Carolina, or any such like charitable hospital purpose which shall be selected therefor by Trustees called for the purpose, complete authority and discretion in and for such selection and utilization being hereby given the Trustees in the premises.

2. The Charter of the University

Section 1. That A. P. Tyer, J. H. Southgate, B. N. Duke, G. A. Oglesby, V. Ballard, J. A. Long, J. F. Burton, J. N. Cole, F. A. Bishop, J. G. Brown, C. W. Toms, J. W. Alspaugh, W. R. Odell, J. A. Gray, F. Stikeleather, Kope Elias, S. B. Turrentine, P. H. Hanes, T. F. Marr, G. W. Flowers, M. A. Smith, R. H. Parker, W. J. Montgomery, F. M. Simmons, O. W. Carr, R. A. Mayer, N. M. Journey, Dred Peacock, B. B. Nicholson, W. G. Bradsher, E. T. White, T. N. Ivey, J. B. Hurley, R. L. Durham, W. C. Wilson, and their associates and successors shall be, and continue as they have been, a body politic and corporate under the name and style of DUKE UNIVERSITY, and under such name and style shall have perpetual existence and are hereby invested with all the property and rights of property which now belong to the said corporation, and said corporation shall henceforth and perpetually, by the name and style of

DUKE UNIVERSITY, hold and use all the authority, privileges, and possessions it had or exercised under any former title and name, and be subject to all recognized legal liabilities and obligations now outstanding against such corporations.

Section 2. That such corporation is authorized to receive and hold by gift, device, purchase or otherwise, property, real and personal, to be held for the use of said University and its dependent schools or for the use of either or both (as may be designated in the conveyance or will).

Section 3. That the Trustees shall be thirty-six in number of whom twelve shall be elected by the North Carolina Conference of the M. E. Church, South; twelve by the W. N. C. Conference of the said church; and twelve by the graduates of said University; *Provided*, however, That no person shall be elected a Trustee till he has first been recommended by a majority of the Trustees present at a regular meeting; and the Trustees shall have power to remove any member of their body who may remove beyond the boundary of the State or who may refuse or neglect to discharge the duties of a Trustee. The term of office of Trustees shall be six years, and they shall be so arranged that four Trustees shall be elected by each Conference and four by the graduates every two years. The Trustees shall regulate by bylaws the manner of election of Trustees to be chosen by the graduates. Should there exist a vacancy by death, resignation, or otherwise of any Trustee, the same shall be filled for the unexpired term by the Board of Trustees. That the present Trustees shall continue and remain in office during the term for which they have been heretofore respectively elected.

Section 4. That the said corporation shall be under the supervision, management and government of a president and such other persons as said Trustees may appoint; the said president, with the advice of other persons so appointed, shall from time to time make all needful rules and regulations for the internal government of said University and prescribe the preliminary examinations and terms and conditions on which pupils shall be received and instructed.

Section 5. That said Trustees shall have power to make such rules, regulations, bylaws not inconsistent with the Constitution of the United States and of this State, as may be necessary for the good government of said University and management of the property and funds of the same.

Section 6. That the Trustees shall have power to fix the time of holding their annual and other meetings, to elect a president and professors for said University, to appoint an executive committee to consist of not less than seven members, which committee shall control the internal regulations of said University and fix all salaries and emoluments, and to do all other things necessary for an institution of learning not inconsistent with the laws of this State and of the United States.

Section 7. That the Faculty and Trustees shall have the power of

conferring such degrees and marks of honor as are conferred by colleges and universities generally; and that five Trustees shall be a quorum to transact business.

Section 8. That all laws and parts of laws or of the charter heretofore granted which are in conflict with this act are hereby repealed.

Section 9. That this act shall be in force from and after its ratification and acceptance by the Board of Trustees.

3. The Bylaws of the University

Article I. Aims

1. The aims of Duke University are to assert a faith in the eternal union of knowledge and religion set forth in the teachings and character of Jesus Christ, the Son of God; to advance learning in all lines of truth; to defend scholarship against all false notions and ideals; to develop a Christian love of freedom and truth; to promote a sincere spirit of tolerance; to discourage all partisan and sectarian strife; and to render the largest permanent service to the individual, the state, the nation, and the church. Unto these ends shall the affairs of this University always be administered.

Article II. Board of Trustees

1. **Powers.** All powers of the University shall be vested in a Board of Trustees consisting of thirty-six members.

2. **Nomination and Elections.** The Trustees shall be elected as follows, twelve by the North Carolina Conference of the Methodist Church; twelve by the Western North Carolina Conference of the Methodist Church; and twelve by the General Alumni Association of Duke University.

The Executive Committee, acting as a committee on nominations, shall report to the Board the names of the persons whom it nominates for election as Trustees. The Board, by majority vote of the Trustees present at a regular meeting, shall recommend the persons to be elected Trustees and submit its recommendations to the appropriate Conference of the Methodist Church and the General Alumni Association.

No person who shall have attained the age of seventy years shall be elected a Trustee.

3. **Term.** The term of office of a Trustee shall be six years, beginning on the first day of January following the election, and the terms shall be so arranged that four Trustees shall be elected by each Conference and four by the General Alumni Association every two years.

4. **Vacancies.** Any vacancy in the membership of the Board of Trustees

shall be filled for the unexpired term by a majority vote of the Trustees present at a regular meeting of the Board.

5. Retirement. A Trustee who attains or has attained the age of seventy years shall retire at the end of the term for which he has been elected.

6. Emeritus. The Board of Trustees may elect a retiring or resigning Trustee a Trustee Emeritus. Trustees Emeriti shall be entitled to receive notice of all meetings of the Board and attend and participate in such meetings, but shall not have the right to vote.

7. Removal. Any Trustee who may refuse or neglect to discharge the duties of Trustee may be removed by the affirmative vote of three-fourths of the members of the entire Board of Trustees.

Article III. Meetings of the Board

1. Annual Meeting. The annual meeting of the Board of Trustees shall be held on the Saturday before the first Monday in June.

2. Regular Meetings. Regular meetings of the Board of Trustees shall be held on the first Friday in November and March.

3. Special Meetings. Special meetings shall be held upon the call of the Chairman, or upon written request of twelve or more Trustees addressed to the Secretary, with a copy to the Chairman specifying the business to be transacted at the meeting.

4. Notice. The Secretary shall give at least five days' notice to each member of the Board stating the time and place of all meetings, and the purpose of any special meeting.

5. Place. All meetings of the Board of Trustees shall be held at Duke University in the City of Durham, North Carolina, except that the Trustees by vote, or written assent, of a majority of the then members of the Board may designate another place for any meeting.

6. Quorum. A majority of the then members of the Board of Trustees shall be a quorum for the transaction of business.

Article IV. Officers of the Board

1. Officers of the Board. The officers of the Board of Trustees shall be a Chairman, a Vice Chairman, and a Secretary.

2. Election. The officers of the Board of Trustees shall be elected at its annual meeting for a term of one year or until their successors are elected and qualified.

3. Duties.

a. The Chairman shall preside at all meetings of the Board, shall represent the Trustees at public meetings of the University, and shall be a member of and Chairman of the Executive Committee.

b. The Vice Chairman shall perform the duties of the Chairman in

the absence or disability of the Chairman, or in the event of a vacancy in that office.

- c. The Secretary of the University shall also be the Secretary of the Board of Trustees. He shall record the minutes of all meetings of the Board and its Executive Committee, and shall have custody of the Charter, Bylaws, minutes, records and other documents of the Board and its Committees. The Secretary shall send a copy of the minutes to each member of the Board promptly after each meeting of the Board and of the Executive Committee.

4. *Vacancies.* A vacancy in any office of the Board of Trustees may be filled for the unexpired term by the Board of Trustees.

Article V. Committees of the Board

1. *Committees.* The Standing Committees of the Board shall be:

1. Executive Committee
2. Building and Grounds Committee
3. Committee for Institutional Advancement
4. University Committee.

The Board of Trustees may authorize other committees from time to time.

The Committees of the Board of Trustees shall have the powers and duties set forth in these Bylaws and such other powers and duties as the Board may delegate to them. They shall exercise their powers and perform their duties subject to the direction and approval of the Board. They may from time to time make recommendations to the Board for the establishment of new policies or any changes in existing policies.

2. *Membership.* At each annual meeting the Board of Trustees shall elect the members of the four Standing Committees to serve for the ensuing year. The Chairman of the Board of Trustees and the President of the University shall be members of the Executive Committee and shall be ex officio, non-voting members of all other Committees of the Board of Trustees.

Insofar as practical membership on the Standing Committees should be rotated.

3. *Vacancies.* Any vacancy in the membership of a Standing Committee shall be filled by the Chairman of the Board of Trustees.

4. *Meetings.* Each Standing Committee shall meet at such times and places and upon such notice as it may determine, and shall file a copy of the minutes of each meeting with the Secretary of the University.

5. *Quorum.* A majority of the then members of a Standing Committee shall be a quorum for the transaction of business.

Article VI. Executive Committee

1. Membership. The Chairman of the Board, the President of the University, and not less than five Trustees shall constitute the Executive Committee of this Board.

2. Powers and Duties. The Executive Committee shall:

- a. Control the internal regulations of the University.
- b. Fix all salaries, emoluments, and other allowances.
- c. Approve annual budget and authorize the annual audit.
- d. Appoint an Investment Committee of not less than five members, at least two of whom shall be Trustees, with such powers and duties as may be assigned to it by the Executive Committee.
- e. Subject to the provisions of the Charter and these Bylaws, exercise all powers of the Board of Trustees in the interims between meetings of the Board.
- f. Report its actions to the Board of Trustees.
- g. Act as the Nominating Committee for the election of Trustees.
- h. Appoint a Budget and Audit Committee, composed of not less than three (3) members, at least two (2) of whom shall be Trustees, and the Vice President for Business and Finance, ex officio, with such powers and duties as may be assigned to it by the Executive Committee.

Article VII. Building and Grounds Committee

1. Membership. The Building and Grounds Committee shall be composed of not less than five Trustees and the Vice President for Business and Finance ex officio.

2. Powers and Duties. The Building and Grounds Committee shall consider proposals by the President for:

- a. Plans for the development and use of the University's buildings, grounds, and utilities devoted to educational purposes.
- b. The kind, location and plans for all buildings, utilities and improvements, including roads and parking areas.
- c. Architects and contractors.

The Committee shall have authority to accept all new construction on behalf of the University but shall not incur any expenses not previously authorized by the Board of Trustees or the Executive Committee.

The Committee shall report its findings and recommendations to the Board of Trustees or the Executive Committee.

Article VIII. Committee for Institutional Advancement

1. Membership. The Committee for Institutional Advancement shall

be composed of not less than five Trustees and the Vice President for Institutional Advancement ex officio.

2. Powers and Duties. The Committee for Institutional Advancement shall consider proposals by the President for policies and plans concerning the financial development, fund raising, public relations, and alumni affairs of the University.

The Committee shall report its findings and recommendations to the Board of Trustees or the Executive Committee.

Article IX. University Committee

1. Membership. The University Committee shall be composed of not less than twelve Trustees and the Provost ex officio.

2. Powers and Duties. The University Committee shall:

- a. Serve as a Board of Visitors to the University.
- b. Serve as a Committee on Earned Degrees.
- c. Consider proposals by the President for the educational role of each school, college, and unit of the University and for the University as a whole, the admission of students at all levels, student life and activities, educational and research programs, and the coordination of all educational activities.
- d. Designate five trustees who, along with an equal number of faculty members designated by the President, and the President ex officio, shall serve as a Committee on Honorary Degrees to make recommendations to the University Faculty and the Board of Trustees.

The Committee shall report its findings and recommendations to the Board of Trustees or the Executive Committee.

Article X. Officers of the University

1. The Officers of the University shall be a President, a Provost, a Vice President for Business and Finance, a Vice President for Institutional Advancement, one or more other Vice Presidents, a Treasurer, a Secretary, a University Counsel, and such other officers as the Board of Trustees may elect. One person may hold more than one office, except that the offices of President and Secretary may not be held by the same person.

2. These Officers shall be elected by the Board of Trustees at its annual meeting for a term of one year and shall serve until their successors are elected and have taken office.

3. A vacancy in any office of the University may be filled, for the unexpired term, by the Board of Trustees or by the Executive Committee.

Article XI. President

1. The President shall be the chief educational and administrative officer of the University. He shall be responsible to the Board of Trustees for the supervision, management, and government of the University, and for interpreting and carrying out the policies of the Board of Trustees. He shall have the powers and duties set forth in the Charter and in these Bylaws, and such other powers and duties as the Board of Trustees shall delegate to him.

2. He, or someone designated by him, shall preside at all academic functions and represent the University before the public.

3. He shall preside at all meetings of the University Faculty. He may veto any action taken by the University Faculty or any action taken by the faculty of any college or school in the University and state his reasons for such action.

4. He shall submit a proposed annual budget for the University to the Executive Committee prior to the beginning of the fiscal year covered by the budget.

5. He shall submit to the Board of Trustees an annual report on the condition, operations and needs of the University.

6. He shall recommend to the Board of Trustees persons to be officers of the University other than the President.

Article XII. Provost

1. The Provost shall be an executive officer of the University, under the President, responsible for all educational affairs and activities, including research and the University Hospital, and for all aspects of student activity and welfare. He shall have the powers and duties assigned to him by the President and shall report to the President.

2. He shall be a member of the faculty of each college and school, and ex officio a member of each committee (other than Committees of the Board of Trustees) or other body concerned with matters for which he is responsible.

3. He shall receive recommendations developed by the faculty and educational officers for consideration and recommendation to the President.

4. He shall assume the powers and duties of the President during the incapacity or absence of the President or in case of a vacancy in that office.

Article XIII. Vice President for Business and Finance

1. The Vice President for Business and Finance shall be an executive officer, under the President, responsible for all business and finance, in-

cluding accounting and auditing, preparation of budgets, fiscal planning, and operating of services of the University. He shall have the power and duties assigned to him by the President and shall report to the President.

2. He shall have custody of all records, contracts, agreements, deeds, and other documents of the University or relating to its operations or properties, except minutes of meetings.

3. He shall submit to each regular meeting of the Executive Committee a report on those aspects of the finances of the University that the Executive Committee may require, and shall submit to the Board of Trustees at the end of each fiscal year an account of all receipts and disbursements for the preceding year and a statement in such detail as the Board of Trustees may require of the financial condition of the University at the end of such year.

4. He and the personnel under him shall be bonded to the extent determined by the Executive Committee.

Article XIV. Vice President for Institutional Advancement

The Vice President for Institutional Advancement shall be an executive officer, under the President, responsible for all public and alumni relations, fund raising, and long range planning and development. He shall have the powers and duties assigned to him by the President and shall report to the President.

Article XV. Treasurer

1. The Treasurer shall report to the President or such officer of the University as the President may direct and shall have the powers and duties assigned to him by the President or such other officer.

2. He may receive and disburse investment funds and purchase, sell, or otherwise dispose of investment securities pursuant to the directions of the Executive Committee or Investment Committee, as the case may be.

3. He and the personnel under him shall be bonded to the extent determined by the Executive Committee.

Article XVI. Secretary

1. The Secretary, under the President, shall have all of the powers and duties set forth in these Bylaws and the powers and duties commonly incident to his office. He also shall have the powers and duties assigned to him by the President and shall report to the President.

2. He shall be the custodian of the seal of the corporation and shall affix and attest to same on all duly authorized contracts, deeds, and other documents.

3. He shall maintain an official roster setting forth the status of all persons employed by the University.

Article XVII. University Counsel

The University Counsel shall be the legal advisor to the University and shall be responsible for all matters of a legal nature concerning the University, including litigation, preparation or approval of all contracts, deeds, conveyances, or other documents.

Article XVIII. Faculty

1. The University Faculty shall be composed of the President, the Provost, the Vice Presidents, the Secretary (who shall also be the Secretary of the Faculty), all deans, professors, associate professors, and assistant professors, Registrar, and the University Librarian, and such other persons as may be designated by the President and approval by the Executive Committee or the Board of Trustees.

2. The University Faculty shall be responsible for the conduct of instruction and research in the various colleges and schools in the University. It may also consider and make recommendations to the President regarding any and all phases of education at the University.

3. The University Faculty shall approve and recommend to the Board of Trustees the persons it deems fit to receive degrees or other marks of distinction, and the establishment of any new degree or diploma.

4. The University Faculty may organize and exercise its functions through appropriate councils, committees, or other bodies.

5. Each college and school in the University may have a faculty of its own, which shall be composed of the President, the Provost, the Secretary, and all members of the University Faculty in the particular college or school. Each such faculty shall function under the President and other officers of educational administration and subject to the regulations of the University Faculty.

Article XIX. Appointments, Promotions and Tenure

1. Members of the University Faculty shall be elected, appointed, or promoted by the Board of Trustees or the Executive Committee upon the recommendation of the Provost, with the approval of the President.

2. Members of the University Faculty, above the rank of instructors, shall have tenure after seven years of continuous service at the University, or such shorter period as may be determined for individual cases, by the Board of Trustees or the Executive Committee; provided that any such person shall be subject to dismissal by the Board of Trustees or the Executive Committee for misconduct or neglect of duty.

Article XX. Sabbatical Leaves

1. Each member of the University Faculty of the rank of professor, associate professor, or assistant professor shall be eligible for sabbatical leave after each six years of service to the University. Such leave may be taken for a full year at half salary or a half year at full salary.

2. Sabbatical leave may be granted by the Executive Committee upon the written recommendation of the dean of the appropriate college or school, approved by the Provost and the President.

Article XXI. Retirement

1. All members of the faculty of the University who are eligible for or participate in the TIAA Plan and who would attain the age of seventy years prior to March 1 of a given academic year shall retire at the end of the preceding academic year and all such members of the faculty who attain the age of seventy years on or after March 1 in a given academic year shall retire at the end of such academic year.

2. The retirement and annuity plan adopted by the University on October 1, 1925, is hereby amended in those respects required to conform with the provisions of the Bylaws.

Article XXII. Fiscal Year, Academic Year and Academic Calendar

1. The fiscal year of the University shall commence on July 1 and end on the following June 30.

2. The academic year of the University shall commence on September 1 and end on the following August 31.

3. The President shall establish the academic calendar for each academic year, except that graduation exercises shall take place on the first Monday in June of each year.

Article XXIII. Amendment of Bylaws

These Bylaws may be amended at any regular meeting of the Board of Trustees by the affirmative vote of two-thirds of the then membership of the Board, provided that the proposed amendment is mailed by the secretary of the Board to each member at least twenty days before the meeting.

Alumni Organizations

All former students of Duke University are enrolled as members of the General Alumni Association. This organization meets annually, at Commencement, to transact appropriate business and to hear a report on the state of the University from the President of the University or his representative. At this time, too, the Association elects its officers, alumni representatives to the University's Board of Trustees, and alumni representatives to the Athletic Council.

In addition to the General Alumni Association, there are individual associations for seven of the University's nine schools and colleges. These include, at the undergraduate level, the Woman's College, the School of Nursing, and the School of Engineering, and at the graduate and professional level, the Schools of Medicine, Forestry, Law, and Divinity. Each of these associations meets at least once each year to transact pertinent business and to elect officers.

Each class that has been graduated from the University also exists as a permanent organization, and its members will customarily reunite at intervals of five years. In approximately 100 locations, where Duke alumni live in concentrated numbers, there are local alumni associations with purposes compatible to those of the General Alumni Association.

The executive body of the larger organization of alumni is the Duke University National Council, which also has representation from each of the University's faculties, from its administration and trustees, and from groups of special friends. The National Council meets twice each year, on Founders' Day and at Commencement, to establish and review the programs and policies that govern the activities of all alumni organizations and their relationships with the University.

The Department of Alumni Affairs is maintained by the University to implement, coordinate, and administratively assist in the execution of programs of alumni and alumni related activity. The Department also maintains alumni records and mailing lists and issues periodic publications designed to keep alumni and friends informed about organizational and University developments.

The purposes of all Duke University alumni organizations can best be indicated by quoting Article II of the constitution of the General Alumni Association: "The objects of this association shall be to promote the welfare and progress of Duke University, to maintain and cultivate good fellowship among its members, and to exercise the functions created for alumni . . . in the Charter of the University."

Gifts and Bequests

Duke University is a privately established institution which derives its principal support from endowment funds and from gifts and grants, thus enabling it to offer both academic and professional training to its students at a fraction of the actual cost. Gifts and grants for both operational and capital development purposes presently account for approximately one-half of the University's annual income. They are essential to the quality of its educational services and to its progress as a center of learning and research.

Gifts to Duke University, of course, fully qualify as tax deductible contributions.

The University welcomes gifts, immediate or deferred, when made without restriction as to use or when designated for any of a broad variety of purposes. Gifts may be of cash, securities, or any kind of real or personal property, depending upon the wishes and the conveniences of the donor, and University officers are prepared to confer at any time to make sure that both the donor's wishes and possible tax advantages are fully realized.

A number of publications, designed to assist the donor in making a gift, are available, and requests for these or other information will be promptly acknowledged. Such requests should be addressed to the Office of the Vice President for Business and Finance, 211 Allen Building, Duke University, Duke Station, Durham, N.C.

Deferred gifts may be made through bequests or through insurance, as well as through a variety of trust arrangements. Such gifts may become significant factors in estate planning, and while qualified counseling is essential in most instances, some sample bequest forms may be noted:

General

I give (devise; if real property) and bequeath to Duke University, a corporation existing under the laws of the State of North Carolina

and located in the City and County of Durham, State of North Carolina, and its successors forever, the sum of dollars (or otherwise describe the gift) for the general purposes and uses of the University at the discretion of the Board of Trustees.

Specific

I give (devise; if real property) and bequeath to Duke University, a corporation existing under the laws of the State of North Carolina and located in the City and County of Durham, State of North Carolina, or its successors forever, the sum of dollars (or otherwise describe the gift) and direct that the income therefrom shall be used for the following purposes, viz. (here describe the use desired).

Codicil

Having hereinbefore made my last Will and Testament dated, and being of sound mind, I hereby make, publish, and declare the following codicil thereto; (here insert clause in same form as if it had been included in body of Will). Except as hereinbefore changed, I hereby ratify, confirm, and republish my said last Will and Testament.

Office of Information Services

The Office of Information Services is the official news agency of the University, and all University news, except sports, emanates from this office. The Office maintains the University's relationship with the press, radio and television, and other communications media, and interprets the University—its faculty, its research, and its academic achievements—to the public via these media.

The Office also maintains individual biographical files on all faculty members, students, and staff, as well as files on all University departments and activities. Its files of clippings form a rich source of historical information of the Institution's life. In addition, the Office is a source of information for the many inquiries about Duke University which are received daily from all sections of the nation and from abroad.

Directory of the
Officers, Faculty, and Staff



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Officers of the University for the Year 1965-66^{*}

The Corporation

The University Trustees

(The date in parentheses indicates the year of election.)

Trustees whose term expires December 31, 1967

Calvin Bryan Houck (1951)	Roanoke, Va.
Edwin Lee Jones (1945)	Charlotte, N. C.
Ben Neely Miller, Jr. (1958)	Columbia, S. C.
†Frank Odell Sherrill (1959)	Charlotte, N. C.
James Raymond Smith (1934)	Mt. Airy, N. C.
Thomas Fuller Southgate, Jr. (1959)	Mt. Airy, N. C.
Estelle Flowers Spears (1951)	Durham, N. C.
Richard Elton Thigpen (1953)	Charlotte, N. C.

From the Alumni

Benjamin Ferguson Few (1941)	Southport, Conn.
Julius Welch Harriss (1947)	High Point, N. C.
Robert Henry Pinnix (1959)	Gastonia, N. C.
Charles Sylvanus Rhyne (1961)	Washington, D. C.

Trustees whose terms expires December 31, 1969

Robert Wallace Bradshaw (1959)	Wilson, N. C.
Thomas A. Finch (1964)	Thomasville, N. C.

^{*} The following list is complete through May 1, 1966.
† Elected Trustee Emeritus, March 4, 1966.

George Melvin Ivey, Sr. (1964)
 Thomas Lee Perkins (1958)
 Henry Edward Rauch (1964)
 Mary D. B. T. Semans (1961)
 Wright Tisdale (1957), *Chairman*
 James Frederick Von Canon (1959)

Charlotte, N. C.
 New York, N. Y.
 Greensboro, N. C.
 Durham, N. C.
 Dearborn, Mich.
 Sanford, N. C.

From the Alumni

Charles Phillips Bowles (1954)
 Norman Edward Edgerton (1941)
 Amos Ragan Kearns (1945)
 Pleasant Huber Hanes, Jr. (1954)

Albemarle, N. C.
 Raleigh, N. C.
 High Point, N. C.
 Winston-Salem, N. C.

Trustees whose term expires December 31, 1971

George Venable Allen (1961), *Vice Chairman*
 A. Merrimon Cuniggim (1963)
 Benjamin Everett Jordan (1943)
 George Crews McGhee (1962)
 Marshall I. Pickens (1963)
 Henry Gibbons Ruark (1962)
 Walter McGowan Upchurch, Jr. (1964)
 Charles Byrd Wade, Jr. (1964)

Washington, D. C.
 St. Louis, Mo.
 Saxapahaw, N. C.
 Bonn, Germany
 Charlotte, N. C.
 Rocky Mount, N. C.
 New York, N. Y.
 Winston-Salem, N. C.

From the Alumni

Kenneth Millikan Brim (1952)
 Edgar Harrison Nease (1950)
 °George Robert Wallace (1954)

Greensboro, N. C.
 Winston-Salem, N. C.
 Morehead City, N. C.

Trustees Emeriti

Sidney Sherrill Alderman (1934)
 Thomas A. Aldridge (1959)
 Charles Albert Cannon (1949)
 Norman Atwater Cocke (1947)
 Donald Siler Elias (1929)
 Pleasant Huber Hanes (1912)
 Joshua Lawrence Horne (1934)
 Robert Andrew Mayer (1897)
 James Buren Sidbury (1947)
 Kenneth Crawford Towe (1954)
 †Earle Wayne Webb (1933)
 Bunyan Snipes Womble (1915)

France
 Naples, Fla.
 Concord, N. C.
 Charlotte, N. C.
 Asheville, N. C.
 Winston-Salem, N. C.
 Rocky Mount, N. C.
 Charlotte, N. C.
 Wilmington, N. C.
 Greenwich, Conn.
 Rowayton, Conn.
 Winston-Salem, N. C.

Committees of the University Trustees

Executive Committee

Wright Tisdale, *Chairman*
 George V. Allen, *Vice Chairman*
 Douglas Maitland Knight
 George M. Ivey
 Edwin L. Jones, Sr.
 Amos R. Kearns
 Thomas L. Perkins

Dearborn, Mich.
 Washington, D. C.
 Durham, N. C.
 Charlotte, N. C.
 Charlotte, N. C.
 High Point, N. C.
 New York, N. Y.

° Elected Trustee Emeritus, March 4, 1966.

† Deceased July 7, 1965.

Henry E. Rauch
Frank O. Sherrill
Walter McGowan Upchurch, Jr.

Greensboro, N. C.
Charlotte, N. C.
New York, N. Y.

Building and Grounds Committee

Frank O. Sherrill, *Chairman*
Norman E. Edgerton
J. Welch Harriss
J. Raymond Smith
Fred Von Canon

Charlotte, N. C.
Raleigh, N. C.
High Point, N. C.
Mt. Airy, N. C.
Sanford, N. C.

Committee for Institutional Advancement

George V. Allen, *Chairman*
Charles P. Bowles
Thomas A. Finch, Jr.
George M. Ivey
Edwin L. Jones
Marshall I. Pickens
Robert H. Pinnix
Henry E. Rauch
Charles S. Rhyne
Thomas F. Southgate, Jr.
Charles Wade, Jr.

Washington, D. C.
Albemarle, N. C.
Thomasville, N. C.
Charlotte, N. C.
Charlotte, N. C.
Charlotte, N. C.
Gastonia, N. C.
Greensboro, N. C.
Washington, D. C.
Mt. Airy, N. C.
Winston-Salem, N. C.

University Committee

Walter McGowan Upchurch, Jr., *Chairman*
Mrs. Mary Semans, *Vice Chairman*
Robert W. Bradshaw
Merrimon Cuningim
Benjamin Ferguson Few
P. Huber Hanes, Jr.
Calvin B. Houck
B. Everett Jordan
Ben Neely Miller
Edgar H. Nease
Henry G. Ruark
Estelle F. Spears
Richard E. Thigpen
George R. Wallace

New York, N. Y.
Durham, N. C.
Wilson, N. C.
St. Louis, Mo.
Southport, Conn.
Winston-Salem, N. C.
Roanoke, Va.
Saxapahaw, N. C.
Columbia, S. C.
Winston-Salem, N. C.
Elizabeth City, N. C.
Durham, N. C.
Charlotte, N. C.
Morehead, N. C.

General Administration

Douglas Maitland Knight, Ph.D., Litt.D., LL.D., L.H.D.
President

2138 Campus Drive

Robert Taylor Cole, Ph.D.
Provost

7 Sylvan Road

Gerhard Chester Henricksen, M.A., C.P.A.
Vice President for Business and Finance
Treasurer

3629 Westover Road

Everett Harold Hopkins, M.A., LL.D.
Vice President for Planning and Institutional Studies
Assistant Provost

2016 Campus Drive

Frank Leon Ashmore, A.B.	
<i>Vice President for Institutional Advancement</i>	2637 McDowell Street
Charles Edward Jordan, A.B., LL.D.	
<i>Vice President for University Relations</i>	615 West Campus Drive
Frank Traver de Vyver, Ph.D.	
<i>Vice Provost</i>	8 Sylvan Road
Harold W. Lewis, Ph.D.	
<i>Vice Provost</i>	2307 Sprunt Street
Barnes Woodhall, M.D.	
<i>Vice Provost</i>	4006 Dover Road
Benjamin Edward Powell, Ph.D.	
<i>Librarian</i>	3609 Hathaway Road
Richard Lovejoy Tuthill, Ed.D.	
<i>University Registrar</i>	2709 Dogwood Road
Craufurd David Goodwin, Ph.D.	
<i>Secretary and Assistant Provost</i>	2256 Cranford Road
Edwin Constant Bryson, LL.B.	
<i>University Counsel</i>	818 Anderson Street

Emeriti

Thomas Malcolm Aycock, M.A.	
<i>Professor Emeritus of Physical Education</i>	D-2-D University Apartments
Lucius Aurelius Bigelow, Ph.D.	
<i>Professor Emeritus of Chemistry</i>	131 Pinecrest Road
Harold Crusius Bird, Ph.B., C.E.	2621 Hampton Avenue
<i>Professor Emeritus of Civil Engineering</i>	Charlotte, N. C.
John Saeger Bradway, A.M., LL.B.	Hastings School of Law
<i>Professor Emeritus of Law</i>	University of California, San Francisco, Calif.
Roberta Florence Brinkley, Ph.D.	No. 4, 4th Street, N.E.
<i>Professor Emeritus of English and</i>	Apartment D
<i>Dean Emeritus of the Woman's College</i>	Washington 3, D. C.
Alfred Smith Brower, A.B.	
<i>Business Manager and Treasurer Emeritus</i>	2543 Sevier Street
Je Harned Bufkin, R.N., R.R.L.	
<i>Associate Professor Emeritus of Medical</i>	
<i>Record Library Science</i>	912 Anderson Street
Benjamin Guy Childs, M.A.	
<i>Professor Emeritus of Education</i>	1019 West Markham Avenue
Frederick Augustus Grant Cowper, Ph.D.	
<i>Professor Emeritus of Romance Languages</i>	1017 Dacian Avenue
Mason Crum, Ph.D., Litt.D.	
<i>Professor Emeritus of Biblical Literature</i>	Lake Junaluska, N. C.
Wilburt Cornell Davison, M.D., D.Sc., LL.D.	
<i>James B. Duke Professor Emeritus of Pediatrics and Dean</i>	
<i>Emeritus of the School of Medicine</i>	Box 34, Roaring Gap, N. C.
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Howard Easley, Ph.D.	
<i>Associate Professor Emeritus of Education</i>	10 Lebanon Circle
Frank Nicholas Egerton, A.M., E.E.	Brevard College
<i>Associate Professor Emeritus of Electrical Engineering</i>	Brevard, N. C.

Wiley Davis Forbus, M.D.	
<i>Professor Emeritus of Pathology</i>	3309 Devon Road
Allan H. Gilbert, Ph.D.	Apartment PH-J, 69 West 9th Street
<i>Professor Emeritus of English</i>	New York, N. Y.
Paul Magnus Gross, Ph.D.	
<i>William Howell Pegram Professor</i>	3816 Dover Road
<i>Emeritus of Chemistry</i>	Hope Valley
Julia Rebecca Grout, M.S.	Post Office Box 3084
<i>Professor Emeritus of Physical Education</i>	West Durham Station
Howard N. Haines, B.S.	
<i>Associate Professor Emeritus of Civil Engineering</i>	3530 Randolph Street
Frank Gregory Hall, Ph.D.	
<i>Professor Emeritus of Physiology and Pharmacology</i>	122 Pinecrest Road
William Holland Hall, A.M., M.S.C.E.	
<i>Dean Emeritus of the College of Engineering and</i>	Johnson Apartment
<i>J. A. Jones Professor Emeritus of Engineering</i>	304 Watts Street
George T. Hargitt, Ph.D., Sc.D.	
<i>Professor Emeritus of Zoology</i>	811 Watts Street
Hornell Norris Hart, Ph.D.	Florida Southern College
<i>Professor of Emeritus of Sociology</i>	Lakeland, Fla.
J. Deryl Hart, M.D.	
<i>President Emeritus and</i>	
<i>Professor Emeritus of Surgery</i>	2324 Duke University Road
Charles Cleveland Hatley, Ph.D.	
<i>Professor Emeritus of Physics</i>	Mt. Pleasant, N. C.
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Herbert James Herring, LL.D.	
<i>Vice President Emeritus</i>	2605 Sevier Street
Duncan Charteris Hetherington, Ph.D., M.D.	
<i>Professor Emeritus of Anatomy</i>	K-3B University Apartments
*Franklin Simpson Hickman, Ph.D., D.D.	809 West Maumee Street
<i>Professor Emeritus of the Psychology of Religion</i>	Angola, Ind.
Arthur Owen Hickson, Ph.D.	
<i>Professor Emeritus of Mathematics</i>	Box 2727, West Durham Station
Leslie Benjamin Hohman, M.D.	
<i>Professor Emeritus of Psychiatry</i>	1520 Hermitage Court
Jay Broadus Hubbell, Ph.D., Litt.D.	
<i>Professor Emeritus of English</i>	121 Pinecrest Road
William Henry Irving, Ph.D.	
<i>Professor Emeritus of English</i>	2707 Legion Avenue
Howard Eikenberry Jensen, Ph.D.	Lenoir Homes Cottage #6
<i>Professor Emeritus of Sociology</i>	Columbia, Mo.
Brady Rimbey Jordan, Ph.D.	
<i>Professor Emeritus of Romance Languages</i>	117 Pinecrest Road
Clarence Ferdinand Korstian, Ph.D.	
<i>Professor Emeritus of Silviculture and</i>	
<i>Dean Emeritus of the School of Forestry</i>	4 Sylvan Road
Charles Earl Landon, Ph.D.	Box 291
<i>Professor Emeritus of Economics</i>	Buies Creek, N. C.
William Thomas Laprade, Ph.D.	
<i>Professor Emeritus of History</i>	1108 Monmouth Avenue
Malcolm McDermott, LL.B.	1404 N. Main Street
<i>Professor Emeritus of Law</i>	McAllen, Texas
* Deceased November 11, 1965.	

Frank Kirby Mitchell, A.M. <i>Associate Professor Emeritus of English</i>	Mountain Sanitarium Fletcher, N. C.
Hiram Earl Myers, S.T.M., D.D. <i>Professor Emeritus of Biblical Literature</i>	141 Pinecrest Road
Ernest W. Nelson, Ph.D. <i>Professor Emeritus of History</i>	939 Lambeth Circle
Karl Bachman Patterson, A.M. <i>Assistant Professor Emeritus of Mathematics</i>	1024 Monmouth Avenue
Robert Leet Patterson, Ph.D. <i>Professor Emeritus of Philosophy</i>	40 Glenwood Drive Bellehaven, Greenwich, Conn.
Mary Poteat, Ph.D. <i>Assistant Professor Emeritus of English</i>	103 Faculty Apartments
Wally Reichenberg-Hackett, Ph.D. <i>Professor Emeritus of Psychology</i>	College Station Route 3
Joseph B. Rhine, Ph.D. <i>Director Emeritus of Parapsychology Laboratory</i>	Hillsborough, N. C.
Walter James Seeley, M.S. <i>Dean Emeritus of the College of Engineering and James B. Duke Professor Emeritus of Electrical Engineering</i>	1005 Urban Avenue
John Herman Shields, A.M. <i>Associate Professor Emeritus of Accounting</i>	1315 Vickers Avenue
Francis Xavier Shumacher, B.S. <i>Professor Emeritus of Forestry</i>	Pope Road, Route 3
Hilrie Shelton Smith <i>James B. Duke Professor Emeritus of American Religious Thought</i>	2721 Dogwood Road
Mrs. Bessie Whitted Spence, B.D. <i>Assistant Professor Emeritus of Biblical Literature</i>	Methodist Retirement Home
Hersey Everett Spence, B.D., D.D., Litt.D. <i>Professor Emeritus of Religious Education</i>	Methodist Retirement Home
Hertha D. E. Sponer, Ph.D. <i>Professor Emeritus of Physics</i>	3309 Avon Road Hope Valley
Dale Fisher Stansbury, J.S.D. <i>Professor Emeritus of Law</i>	1008 West Trinity Avenue
Frederick William Stocker, M.D. <i>Professor Emeritus of Ophthalmology</i>	1124 West Forest Hills Boulevard
*Herbert Wilfred Sugden, Ph.D. <i>Assistant Professor Emeritus of English</i>	Pinehurst, N. C.
Clement Vollmer, Ph.D. <i>Professor Emeritus of German</i>	1617 Pinecrest Road
†Herbert von Beckerath, Ph.D. <i>Professor Emeritus of Political Science and Economics</i>	Morgan Creek Road Chapel Hill, N. C.
Warren Chase Vosburgh, Ph.D. <i>Professor Emeritus of Chemistry</i>	Route 1, Bahama, N. C.
Arley John Walton, B.S.L., D.D. <i>Professor Emeritus of Church Administration</i>	3650 Mayflower Place Nashville 4, Tenn.
Loring Baker Walton, Ph.D. <i>Professor Emeritus of Romance Languages</i>	2235 Cranford Road
*°Albert Micajah Webb, A.M. <i>Professor Emeritus of Romance Languages</i>	1017 Trinity Avenue

° Deceased April 6, 1966.

† Deceased March 11, 1966.

*° Deceased September 8, 1965.

Mrs. Marie Anne Updike White, A.M. <i>Associate Professor Emeritus of English</i>	107 Pinecrest Road
Mrs. Eugenia Remlin Whitridge, Ph.D. <i>Assistant Professor Emeritus of Sociology</i>	1511 West Pettigrew Street
Alban Gregory Widgery, M.A. <i>Professor Emeritus of Philosophy</i>	Val Vista, Middle Road Winchester, Va.
Ralph Sydney Wilbur, B.S. in M.E., M.E. <i>Professor Emeritus of Mechanical Engineering</i>	1018 Demerius Street
James Wesley Williams, M.S. <i>Professor Emeritus of Civil Engineering</i>	405 Carolina Circle
Frederick Eliphaz Wilson, A.M. <i>Associate Professor Emeritus of German</i>	1020 Demerius Street
Frederick Adolphus Wolf, Ph.D. <i>James B. Duke Professor Emeritus of Botany</i>	924 Urban Avenue

Instructional Staff

(The date in parenthesis indicates the year of appointment.)

Paul W. Abeles (1965), D.Sc. (Vienna) <i>Visiting Professor of Civil Engineering</i>	1016 Gloria Avenue
Frances Dorothy Acomb (1945), Ph.D. (Chicago) <i>Associate Professor of History</i>	H-2B University Apartments
Donald Keith Adams (1931), Ph.D. (Yale) <i>Professor of Psychology</i>	1214 West Cornwallis Road
Phoebe Ahlgren (1962), M.S.N. (Buffalo) <i>Assistant Professor of Nursing</i>	101 Newell Street
P. Wesley Aitkin (1964), Th.M. (Duke) <i>Assistant Professor of Pastoral Care</i>	2909 Harriman Drive
John Richard Alden (1955), Ph.D. (Michigan) <i>James B. Duke Professor of History</i>	2736 Dogwood Road
Irving E. Alexander (1963), Ph.D. (Princeton) <i>Professor of Psychology and Professor of Medical Psychology in Department of Psychiatry</i>	1111 Watts Street
John Cooley Altrocchi (1957), Ph.D. (California) <i>Associate Professor of Psychology and Associate Professor of Medical Psychology in Department of Psychiatry</i>	1110 Woodburn Road
Edwin Pascal Alyea (1930), M.D. (Johns Hopkins) <i>Professor of Urology</i>	3102 Devon Road
Dennis Bernard Amos (1962), M.B. (Guy's Hospital Medical School, London) <i>Professor of Immunology and Associate Professor of Experimental Surgery</i>	Route 3 Hillsborough, N. C.
Carl L. Anderson (1955), Ph.D. (Pennsylvania) <i>Associate Professor of English</i>	Route 2, Box 366
Hugh Anderson (1957), B.D., Ph.D. (Glasgow) <i>Professor of Biblical Criticism and Theology</i>	9 Kimberly Drive
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- Thomas O. Beidelman (1965), D.Phil. (Oxon.)
Associate Professor of Sociology and Anthropology
- Frederick Bernheim (1930), Ph.D. (Cantab.)
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- Mrs. Mary Liliast Christian Bernheim (1930), Ph.D. (Cantab.)
Professor of Biochemistry 115 Woodridge Drive
- Edward Willard Berry (1936), Ph.D. (Johns Hopkins)
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- Thad L. Beyle (1965), Ph.D. (Illinois)
Adjunct Assistant Professor of Political Science 3109 Hyde Street
- Lawrence Christian Biedenharn, Jr. (1961), Ph.D.
 (Massachusetts Institute of Technology)
Professor of Physics 2716 Sevier Street
- Justus Bier (1966), Ph.D. (Zurich)
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- Sam Johnston Caldwell (1964), B.S. (U.S.N.A.) Captain, U.S.N.
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- Edmund McCullough Cameron (1926), A.B. (Washington & Lee)
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Clifton C. Cherpach (1958), Ph.D. (Johns Hopkins) <i>Professor of Romance Languages</i>	235 Forestwood Drive
Donald B. Chesnut (1965), Ph.D. (California Institute of Technology) <i>Associate Professor of Chemistry</i>	4404 Malvern Road
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Sanford I. Cohen (1957), M.D. (Chicago) <i>Professor of Psychiatry</i>	1334 Welcome Circle
Robert R. Cole (1965), M.D. (Arkansas) <i>Associate in Pathology</i>	2209-B Elder Street
Robert Taylor Cole (1935), Ph.D. (Harvard) <i>James B. Duke Professor of Political Science</i>	7 Sylvan Road
Joel G. Colton (1947), Ph.D. (Columbia) <i>Professor of History</i>	2801 Dogwood Road
Robert Merle Colver (1953), Ed.D. (Kansas) <i>Associate Professor of Education</i>	2720 Circle Drive Route 3, Box 62 Garrett Road
Norman Francis Conant (1935), Ph.D. (Harvard) <i>James B. Duke Professor of Microbiology</i>	
Robert Howe Connery (1949), Ph.D. (Columbia) <i>Professor of Political Science</i>	1722 Duke University Road
Robert L. Cook (1965) <i>Instructor in Physics</i>	Carwin Apartments #7
Ralph W. Coonrad (1960), M.D. (Duke) <i>Associate in Orthopedics</i>	3534 Rugby Road

- Thomas Howard Cordle (1950), Ph.D. (Yale)
Associate Professor of Romance Languages R.F.D. #1, Hillsborough, N. C.
- Samuel Owen Cornwell (1960), M.D. (Minnesota)
Assistant Professor of Pediatrics N. C. State Board of Health
 Raleigh, N. C.
- Bruce A. Corrie (1965), M.S. (Indiana)
Assistant Professor of Physical Education 2213 Carver Street
- John D. Costlow (1959), Ph.D. (Duke)
Associate Professor of Zoology 201 Ann Street
 Beaufort, N. C.
- Robert Calvin Cox (1942), M.A. (Columbia)
Associate Professor of Physical Education 1913 University Road
- William H. Cracknell (1963), B.S. (Mount Union), Lieutenant, U.S.N.
Assistant Professor of Naval Science 2307 Alabama Avenue
- Janet Baker Craig (1965), M.S.N. (Duke)
Instructor in Nursing 1018 Buchanan Boulevard
- Joyce Crane (1964), M.S.N. (Western Reserve)
Assistant Professor of Nursing 2717 Augusta Drive
- Robert Irwin Crane (1961), Ph.D. (Yale)
Professor of History 2733 Sevier Street
- *Robert Nowell Creadick (1946), M.D. (Yale)
Professor of Obstetrics and Gynecology 1200 Anderson Street
- Marion Caryle Crenshaw, Jr. (1964), M.D. (Duke)
Assistant Professor of Obstetrics and Gynecology
and Associate in Physiology
- Bruce C. Cresson (1963), Th.M. (Southeastern Baptist Theological Seminary)
Instructor in Religion 2316 Huron Circle
- Elaine Kobrin Crovitz (1965), Ph.D. (Duke)
Associate in Medical Psychiatry 3415 Hope Valley Road
- Herbert Crovitz (1963), Ph.D. (Duke)
Assistant Professor of Medical Psychology in
Department of Psychiatry and Lecturer in Psychology 3415 Hope Valley Road
- William L. Culberson (1955), Ph.D. (Wisconsin)
Associate Professor of Botany King Road, Route 1
- Charles Culver (1963), Ph.D. (Duke)
Assistant Professor of Nursing Education 2920 Guess Road
- †Brainerd Currie (1961), J.S.D. (Columbia)
William R. Perkins Professor of Law 2517 Wrightwood Avenue
- John Shelton Curtiss (1945), Ph.D. (Columbia)
James B. Duke Professor of History 4418 Guess Road
- Robert Earl Cushman (1945), B.D., Ph.D. (Yale)
Professor of Systematic Theology 2022 Campus Drive
- W. Kenneth Cuyler (1959), Ph.D. (Duke)
Professor of Obstetrics and Gynecology and
Associate Professor of Cytology and Anatomy Route 1, Box 52
- Bingham Dai (1943), Ph.D. (Chicago)
Professor of Psychology and Professor of Mental Hygiene 2404 Perkins Road
- Charles J. Daly (1963), M.Ed. (Pennsylvania)
Instructor in Physical Education 2710 McDowell Street
- Elizabeth Reznor Daniel (1960), Ph.D. (North Carolina)
Instructor in Romance Languages 2 Gooseneck Road
 Chapel Hill, N. C.
- Boyd Lee Daniels (1952), B.D., Ph.D. (Duke)
Assistant Professor of Religion 220 Dacian Avenue
- Ollie Belle Davenport (1961), M.S.N. (Western Reserve)
Assistant Professor of Nursing 905 West Knox Street
- * Deceased March 2, 1966.
 † Deceased September 7, 1965.

- Eugene A. Davidson (1957), Ph.D. (Columbia)
Professor of Biochemistry 1639 Marion Avenue
- David George Davies (1961), Ph.D. (California)
Associate Professor of Economics 2631 McDowell Street
- Calvin D. Davis (1962), Ph.D. (Indiana)
Associate Professor of History Apartment 25, Alastair Court
- Gifford Davis (1930), Ph.D. (Harvard)
Professor of Romance Languages 2248 Cranford Road
- James E. Davis (1965), M.D. (Pennsylvania)
Assistant Professor of Surgery 7 Beverly Drive
- Otho L. Davis (1965), M.A. (Kent State)
Assistant Professor of Physical Education 519 East Club Boulevard
- Raymond H. Dawson (1966), Ph.D. (North Carolina)
Visiting Associate Professor of Political Science 315 Hemlock Drive
 Chapel Hill, N. C.
- Eugene Davis Day (1962), Ph.D. (Delaware)
Professor of Immunology 2727 McDowell Street
- Louis DeAlessi (1961), Ph.D. (California)
Associate Professor of Economics 2624 McDowell Street
- Alfred Dean (1963), M.A. (North Carolina)
*Associate in Medical Sociology in the Department of
 Psychiatry and Lecturer in Sociology* 1112 Wells Street
- John Essary Dees (1939), M.D. (Virginia)
Professor of Urology 413 Carolina Circle
- Mrs. Susan Coons Dees (1939), M.D. (Johns Hopkins)
Professor of Pediatrics 413 Carolina Circle
- Robert F. Degnon (1965), B.A. (North Carolina)
Assistant Professor of Naval Science 2504 Nation Avenue
- William J. DeMaria (1951), M.D. (Duke)
*Professor of Preventive Medicine and
 Associate Professor of Pediatrics* 1126 Woodburn Road
 Route 1, Box 21A
 Hillsborough, N. C.
- *William Ernest DeTurk (1949), M.D. (Vanderbilt)
Associate Professor of Pharmacology 3130 Pickett Road
- Frank Traver de Vyver (1935), Ph.D. (Princeton)
Professor of Economics 8 Sylvan Road
- Irving Diamond (1958), Ph.D. (Chicago)
Professor of Psychology 2745 McDowell Street
- Macdonald Dick (1932), M.D. (Johns Hopkins)
*Assistant Professor of Physiology and Pharmacology
 and Associate in Medicine* 3005 Norwich Way
- Robert L. Dickens (1949), M.S. (North Carolina), C.P.A.
Professor of Accounting 2717 Circle Drive
- Marcus L. Dillon (1957), M.D. (Duke)
Associate Professor of Surgery 1005 Minerva Avenue
- Milan S. Djordjevic (1964), Ph.D. (Munich)
Visiting Professor of Mechanical Engineering 2007 House Avenue
- William O. Dobbins (1965), M.D. (Medical College of Alabama)
Assistant Professor of Medicine Four Seasons Apartments
- Mrs. Marie-Therese Liniere Dow (1934), M.A. (Lyon)
Assistant Professor of Romance Languages 2252 Cranford Road
- Neal Dow (1934), Ph.D. (Pennsylvania)
Professor of Romance Languages 2252 Cranford Road

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Francis George Dressel (1929), Ph.D. (Duke)	
<i>Professor of Mathematics</i>	2502 Francis Street
Sadik T. Duda (1962), M.A. (Ankara)	
<i>Instructor in Russian</i>	540 Green Street
Bernard I. Duffey (1963), Ph.D. (Ohio State)	
<i>Professor of English</i>	2732 Dogwood Drive
Kenneth Lindsay Duke (1940), Ph.D. (Duke)	
<i>Associate Professor of Anatomy</i>	2736 McDowell Street
Mrs. Frances Yeager Dunham (1962), Ph.D. (Duke)	
<i>Assistant Professor of Nursing Education</i>	2137 Wright Avenue
Robert F. Durden (1952), Ph.D. (Princeton)	
<i>Professor of History</i>	2532 Wrightwood Avenue
Watt Weems Eagle (1930), M.D. (Johns Hopkins)	
<i>Professor of Otolaryngology</i>	804 Anderson Street
Frank E. Eakin (1965), Ph.D. (Duke)	
<i>Instructor in Religion</i>	2306-B Lednum Street
Paul H. Earls (1959), Ph.D. (Rochester)	
<i>Visiting Assistant Professor of Music</i>	1509 Hollywood Street
Mrs. Eleanor Beamer Easley (1934), M.D. (Duke)	
<i>Associate in Obstetrics and Gynecology</i>	Guess Road
Ruth Buchanan Eddy (1952), M.S. (Smith)	
<i>Associate Professor of Physical Education</i>	705 Louise Circle
James Michael Efrid (1962), Ph.D. (Duke)	
<i>Assistant Professor of Biblical Studies</i>	2033 Parthenia Drive
Carl Eisdorfer (1958), M.D., Ph.D. (New York)	
<i>Associate Professor of Medical Psychology in Department of Psychiatry and Lecturer in Psychology</i>	3423 Hope Valley Road
Robert Eisenberg (1965), Ph.D. (University College, London)	
<i>Associate in Physiology</i>	3503 Mossdale Avenue
Jane C. Elchlepp (1956), M.D., Ph.D. (Chicago)	
<i>Assistant Professor of Pathology</i>	Route 1, Cornwallis Road
William Whitfield Elliott (1925), Ph.D. (Cornell)	
<i>Professor of Mathematics</i>	1740 Hillandale Road
Robert Lee Ellis (1964), B.A. (Miami)	
<i>Assistant Professor of Mathematics</i>	10 Lebanon Circle
Ernest Elsevier (1950), M.S.M.E. (Georgia Institute of Technology)	
<i>Associate Professor of Mechanical Engineering</i>	2412 Wrightwood Avenue
Norbert Beverley Enzer (1965), M.D. (McGill)	
<i>Assistant Professor of Psychiatry and Associate in Pediatrics</i>	2017 Dartmouth Drive
Marilyn T. Erickson (1965), Ph.D. (Washington)	
<i>Visiting Assistant Professor of Education</i>	2601 Tanglewood Drive
Robert P. Erickson (1961), Ph.D. (Brown)	
<i>Associate Professor of Psychology</i>	2601 Tanglewood Drive
E. Harvey Estes, Jr. (1953), M.D. (Emory)	
<i>Professor of Medicine</i>	3542 Hamstead Court
Lawrence E. Evans (1963), Ph.D. (Johns Hopkins)	
<i>Assistant Professor of Physics</i>	403 Watts Street
John Wendell Everett (1932), Ph.D. (Yale)	
<i>Professor of Anatomy</i>	1105 Woodburn Road
Robinson Oscar Everett (1956), LL.B. (Harvard)	
<i>Adjunct Professor of Law</i>	119 North Dillard Street
Henry A. Fairbank (1962), Ph.D. (Yale)	
<i>Professor of Physics</i>	1515 Pinecrest Road

- Carmen M. Falcone (1946), M.A. (Ohio State)
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- W. Reynolds Farley (1964), Ph.D. (Chicago)
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- Donn Michael Farris (1959), B.D., M.S. in L.S. (Columbia)
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- A. A. Fatouros (1966), J.S.D. (Columbia)
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- Ben W. Feather (1963), M.D. (George Washington)
*Assistant Professor of Psychiatry and
 Lecturer in Psychology* Box 3403, Duke Hospital
- John Morton Fein (1950), Ph.D. (Harvard)
Professor of Romance Languages 2742 Circle Drive
- Robert E. Fellows (1966), M.D. (McGill)
Assistant Professor of Physiology and Assistant Professor of Medicine
- Arthur Bowles Ferguson (1939), Ph.D. (Cornell)
Professor of History 22 Lebanon Circle
- Charles E. Ferguson (1957), Ph.D. (North Carolina)
Professor of Economics 1406 Kent Street
- George Burton Ferguson (1937), M.D. (Jefferson)
Assistant Professor of Endoscopy and Laryngology 3938 Dover Road
- Oliver W. Ferguson (1957), Ph.D. (Illinois)
Associate Professor of English 910 West Markham Avenue
- Bernard F. Fetter (1951), M.D. (Duke)
Associate Professor of Pathology 3826 Somerset Drive
- Michael Finger (1965), B.A. (Texas)
Assistant Professor of Economics 1301 Hudson Street, Apartment H
- Ronald L. Fishbaugh (1962), M.S. (Juilliard)
Instructor in Music 2110 Woodrow Street
- Eleanor Flanagan (1960), M.A. (Duke)
Assistant Professor of Physical Therapy 7 Emile Apartments
 Roxboro Road
- John Francis Flanagan (1961), M.D. (Duke)
Assistant Professor of Medicine 2214 Elmwood Drive
- Walter L. Floyd (1959), M.D. (Johns Hopkins)
Assistant Professor of Medicine 3356 Hamstead Court
- Donald J. Fluke (1958), Ph.D. (Yale)
Professor of Zoology 2703 Sevier Street
- Lloyd R. Fortney (1964), Ph.D. (Wisconsin)
Assistant Professor of Physics 1200 Leon Street
- Ellen Gwendolyn Fortune (1964), M.A. (Western Reserve)
Associate Professor of Nursing 212 East Markham Avenue
- Marianka Fousek (1965), Ph.D. (Harvard)
Assistant Professor of Religion 2722 Erwin Road
- Earle Cabell Fowler (1962), Ph.D. (Harvard)
Professor of Physics Lake Shore Drive
 Chapel Hill, N. C.
- John Alvis Fowler (1953), M.D. (Bowman Gray)
*Professor of Psychiatry and
 Assistant Professor of Pediatrics* 1212 Woodburn Road
- Wallace Fowlie (1964), Ph.D. (Harvard)
Professor of Romance Languages 2007 House Avenue, Apartment 19
- Charles H. Frenzel (1956), B.A. (Duke)
Professor of Hospital Administration 3950 Bristol Road
- Irwin Fridovich (1958), Ph.D. (Duke)
Assistant Professor of Biochemistry 3517 Courtland Drive

- Ruth Friedberg (1961), M.A. (North Carolina)
Instructor in Music 2305 Elmwood
- Samuel J. Friedberg (1960), M.D. (Pennsylvania)
Associate Professor of Medicine 2305 Elmwood
- John A. Friedrich (1963), Ph.D. (Michigan State)
Professor of Physical Education 2953 Welcome Drive
- William J. Furbish (1954), M.S. (Wisconsin)
Assistant Professor of Geology Route 2, Box 19, Umstead Road
- Mercedes Gaffron (1958), Ph.D., M.D. (Munich)
Associate Research Professor of Psychology 1612 Maryland Avenue
- Nick Galifanakis (1960), LL.B. (Duke)
Part-time Visiting Assistant Professor of Economics 2648 University Drive
- Thomas Muir Gallie, Jr. (1954), Ph.D. (Rice)
Associate Professor of Mathematics and
Associate Professor of Preventive Medicine 1012 West Trinity Avenue
- Clarence Elsworth Gardner, Jr. (1930), M.D. (Johns Hopkins) P. O. Box 624
Professor of Surgery Hillsborough, N. C.
- Mrs. Ila H. Gehman (1959), Ed.D. (Pennsylvania State)
Associate Professor of Medical Psychology in
Department of Psychiatry and Lecturer in Psychology 1312 Shepherd Street
- W. Scott Gehman, Jr. (1954), Ph.D. (Pennsylvania State)
Associate Professor of Psychology in Education 1312 Shepherd Street
- Rhett Truesdale George, Jr. (1957), Ph.D. (Florida)
Assistant Professor of Electrical Engineering Route 1, Box 281-B
- Nicholas G. Georgiade (1951), D.D.S., M.D. (Duke)
Professor of Plastic, Maxillofacial, and Oral Surgery 2523 Wrightwood Avenue
- Carl J. Gerber (1961), Ph.D. (Washington State)
Associate in Psychology and Associate in Neurology 106 Lattimore Lane
- Gerald E. Gerber (1962), Ph.D. (Northwestern)
Assistant Professor of English 2602 Francis Street
- John Jay Gergen (1936), Ph.D. (Rice)
Professor of Mathematics 2803 Nation Avenue
- Hans W. Gerhard (1959), Df. ter. pol. (Tubingen)
Associate Professor of Economics 2707 Sevier Street
- Robert George Ghirardelli (1962), Ph.D. (California Institute of Technology)
Visiting Assistant Professor of Chemistry 1404 Anderson Street
- Robert H. Gibbs (1964), M.D. (Duke)
Associate in Medicine 2413 Pickett Road
- Donald Gillin (1959), Ph.D. (Stanford)
Associate Professor of History 1300 Georgia Avenue
- James P. Gills (1965), M.D. (Duke)
Associate in Ophthalmology 2528 Wrightwood Avenue
- Donald E. Ginter (1963), Ph.D. (California)
Assistant Professor of History 1918 Dartmouth Drive
- Sherwood Githens, Jr. (1962), Ph.D. (North Carolina)
Professor of Education 4427 Chapel Hill Road
- John Glasson (1960), M.D. (Cornell)
Associate in Orthopedics 615 Swift Avenue
- James F. Glenn (1963), M.D. (Duke)
Professor of Urology 27 Oak Drive
- Clarence Gohdes (1930), Ph.D. (Columbia)
James B. Duke Professor of English 2737 Circle Drive
- Joseph Leonard Goldner (1950), M.D. (Nebraska)
Professor of Orthopedic Surgery 602 East Forest Hills Boulevard

Richard A. Goodling (1959), B.D., Ph.D. (Pennsylvania State)
Associate Professor of Pastoral Care Box 115-A, Route 1, Farrington Road

Jack K. Goodrich (1965), M.D. (Tennessee) 612 Morgan Creek Road
Associate Professor of Radiology Chapel Hill, N. C.

Craufurd D. Goodwin (1962), Ph.D. (Duke)
Associate Professor of Economics 2256 Cranford Road

Walter Gordy (1946), Ph.D. (North Carolina), LL.D.
James B. Duke Professor of Physics 2521 Perkins Road

John A. Goree (1959), M.D. (Duke)
Associate Professor of Radiology 3817 Hillgrand Circle

Ralph J. Gorten (1963), M.D. (Pennsylvania)
Assistant Professor of Medicine and Associate in Physiology 2436 Tryon Road

Virginia Gover (1960), M.S.N. (Boston College)
Assistant Professor of Nursing 2722 Brown Avenue

Lindsay A. Graham (1965), M.D. (McGill)
Associate in Psychiatry 1911-A House Avenue

Richard Babson Grant (1952), Ph.D. (Harvard)
Associate Professor of Romance Languages 2509 Wrightwood Avenue

Irving Emery Gray (1930), Ph.D. (Wisconsin)
Professor of Zoology 124 Pinecrest Road

Edward F. Grayson (1965), M.A. (George Washington)
Assistant Professor of Naval Science 2510 Sparger Road

Robert Lee Green, Jr. (1960), M.D. (Hahnemann)
Associate Professor of Psychiatry 3700 Hermine Street

Ronald C. Greene (1958), Ph.D. (California Institute of Technology)
Assistant Professor of Biochemistry 1014 Norwood Avenue

Joseph C. Greenfield (1962), M.D. (Emory)
Associate Professor of Medicine 1212 Virginia Avenue

Donald D. Greenwood (1964), Ph.D. (Harvard)
Assistant Professor of Otolaryngology, Assistant Professor of Physiology, and Assistant Professor of Psychology 1717 Shawnee Street

John R. Gregg (1957), Ph.D. (Princeton)
Professor of Zoology 3702 Randolph Road

Robert A. Gregg (1961), M.D. (South Carolina)
Associate Professor of Physical Medicine 2747 Sevier Street

Eugene Greuling (1948), Ph.D. (Indiana)
Professor of Physics 2414 Perkins Road

Carlene M. Grim (1966), M.S.N. (North Carolina)
Instructor in Nursing 2121 West Pettigrew Street

Keith Sanford Grimson (1930-42; 1945), M.D. (Rush)
Professor of Surgery 3313 Devon Road

Egil Grislis (1959), B.D., Ph.D. (Yale)
Associate Professor of Historical Theology 2323 Englewood Avenue

Samson R. Gross (1960), Ph.D. (Columbia)
Professor of Genetics and Biochemistry 2411 Prince Street

Walter R. Guild (1960), Ph.D. (Yale)
Professor of Biophysics 2625 McDowell Street

J. Caulie Gunnells (1962), M.D. (South Carolina)
Associate in Medicine 2011 Woodrow Street

W. K. C. Guthrie (1966), D.Litt. (Cantab.)
Visiting James B. Duke Professor of Philosophy University Apartments

Norman Guttman (1951), Ph.D. (Indiana)
Professor of Psychology 201 Woodridge Drive

Robert A. Guyer (1964), Ph.D. (Cornell)
Instructor in Physics 918 Monmouth Avenue

- Donald B. Hackel (1960), M.D. (Harvard)
Professor of Pathology 2535 Perkins Road
- Herbert Hacker, Jr. (1965), Ph.D. (Michigan)
Assistant Professor of Electrical Engineering 108 Pinecrest Road
- Ellis P. Hagler (1936)
Instructor in Physical Education 1715 Cornwallis Road
- Herbert R. Hahn (1963), M.B.A. (Harvard)
Visiting Assistant Professor of Economics 600 Surrey Road
 Chapel Hill, N. C.
- Hugh Marshall Hall (1952), Ph.D. (Texas)
Associate Professor of Political Science 2413 Wrightwood Avenue
- Jack R. Hall (1965), M.A. (Georgia)
Instructor in Physical Education 3329 Rolling Hill Road
- Kenneth D. Hall (1958), M.D. (Duke)
Associate Professor of Anesthesiology 3804 Hillgrand Circle
- Louise Hall (1931), Ph.D. (Radcliffe)
Professor of Architecture Box 6636, College Station
- Thor Hall (1962), B.D., Ph.D. (Duke)
Assistant Professor of Preaching and Theology 3537 Hamstead Court
- John Hamilton Hallowell (1942), Ph.D. (Princeton)
Professor of Political Science 2709 Augusta Drive
- Iain Hamilton (1962), B.M. (London)
Mary Duke Biddle Professor of Music Erwin Apartments
 Buchanan Boulevard
- William Baskerville Hamilton (1936), Ph.D. (Duke)
Professor of History 300 Swift Avenue
 Alastair Court Apartments
- Aram K. Hampikian (1965), M.S.E.E. (Massachusetts Institute of Technology)
Visiting Lecturer in Electrical Engineering 401 Bickett Road, Raleigh, N. C.
- Philip Handler (1939), Ph.D. (Illinois)
James B. Duke Professor of Biochemistry and Nutrition 2529 Perkins Road
- John Kennedy Hanks (1954), M.A. (Columbia)
Associate Professor of Music and
Lecturer in Church Music 1810 Glendale Avenue
- Frank Allan Hanna (1948), Ph.D. (Wisconsin)
Professor of Economics 2239 Cranford Road
- Barry Hannegan (1963), M.A. (New York)
Visiting Instructor in Art 704 North Buchanan Boulevard
- Oscar Carl Edvard Hansen-Prüss (1930), M.D. (Johns Hopkins)
Professor of Medicine 3303 Surrey Road
- Paul Hardin, III (1958), LL.B. (Duke)
Professor of Law and Assistant Professor
of Legal Medicine 2708 Sevier Street
- Charles M. Harman (1961), Ph.D. (Wisconsin)
Associate Professor of Mechanical Engineering 2620 McDowell Street
- Elwood Scott Harrar (1936), Ph.D. (Syracuse)
Professor of Wood Science 2228 Cranford Road
- Paul Harrawood (1956), M.S. in C.E. (Missouri)
Assistant Professor of Civil Engineering 2516 Sevier Street
- Harold Joseph Harris (1960), M.D. (Long Island College of Medicine)
Associate Professor of Psychiatry and 1009 Highland Woods
Assistant Professor of Pediatrics Chapel Hill, N. C.
- Jerome Sylvan Harris (1936), M.D. (Harvard)
J. Buren Sidbury Professor of Pediatrics
and Associate Professor of Biochemistry 2907 Hope Valley Road
- Ruth Harris (1962), M.S. (Boston)
Assistant Professor of Surgical Nursing 2121 Ruffin Street

Francis Parks Harrison (1947), Ph.D. (Michigan) <i>Associate Professor of Physical Education</i>	2722 Circle Drive
William John Harvey (1961), B.S. (Appalachian) <i>Instructor in Physical Education</i>	N-3A University Apartments
George Corbin Harwell (1935), Ph.D. (Duke) <i>Associate Professor of English</i>	2115 Wilson Street
Charles Roy Hauser (1929), Ph.D. (Iowa) <i>James B. Duke Professor of Chemistry</i>	1020 Rosehill Avenue
Clark C. Havighurst (1964), J.D. (Northwestern) <i>Associate Professor of Law</i>	Farrington Road, Route 2 Chapel Hill, N. C.
Charles P. Hayes (1964), M.D. (Duke) <i>Associate in Medicine</i>	3820 Hillgrand Circle
William S. Heckscher (1966), Ph.D. (Hamburg) <i>Benjamin N. Duke Professor of Art</i>	
Peter L. Hein (1963), M.D. (Georgetown) <i>Assistant Professor of Psychiatry</i>	RFD #1 221A Randolph Road
Ursula I. Heine (1965), Ph.D. (Humboldt) <i>Associate in Experimental Surgery</i>	1200 Leon Street, Apartment D-7
Martin Helling (1965), M.S. (Chicago) <i>Instructor in Mathematics</i>	1007 Oakland Avenue
Henry Hellmers (1965), Ph.D. (California) <i>Professor of Botany</i>	1012 Norwood Avenue
James Paisley Hendrix (1938), M.D. (Pennsylvania) <i>Professor of Medicine and Therapeutics</i>	144 Pinecrest Road
Mrs. Mildred L. Hendrix (1958), B.S. (North Carolina) <i>Assistant Professor of Music</i>	144 Pinecrest Road
Simeon K. Heninger (1955), Ph.D. (Johns Hopkins) <i>Associate Professor of English</i>	2650 University Drive
James Donald Henry (1960), M.M. (Indiana) <i>Instructor in Music</i>	311 West Delafield Street
Stuart C. Henry (1959), B.D., Ph.D. (Duke) <i>Professor of American Christianity</i>	K-1-A University Apartments
Charles D. Hepler (1965), M.S. (Iowa) <i>Associate in Pharmacy</i>	Route 2, Box 401 Linden Road
Stephen Duncan Heron, Jr. (1950), Ph.D. (North Carolina) <i>Associate Professor of Geology</i>	Route 1, Box 267-1
Clyde F. Herreid, II (1965), Ph.D. (Pennsylvania State) <i>Assistant Professor of Zoology</i>	1420 Ruffin Street
Frederick L. Herzog (1960), Th.D. (Princeton) <i>Associate Professor of Systematic Theology</i>	2936 Chapel Hill Road
Julia G. Hester (1965), M.S. (North Carolina) <i>Instructor in Nursing</i>	2C Oak Terrace Chapel Hill, N. C.
Albert Heyman (1953), M.D. (Maryland) <i>Professor of Medicine</i>	1216 Woodburn Road
Jacqueline Hijmans (1965), M.D. (State University, Leyden, Holland) <i>Associate in Medicine</i>	2907 Hope Valley Road
David W. Hill (1962), Ph.D. (Stanford) <i>Associate Professor of Engineering Mechanics in Department of Civil Engineering</i>	Apartment 8A Wood Circle Chapel Hill, N. C.
Douglas Greenwood Hill (1931), Ph.D. (Princeton) <i>Professor of Chemistry</i>	Box 275, Route 2, Pleasant Green Road
Robert L. Hill (1961), Ph.D. (Kansas) <i>Professor of Biochemistry</i>	2510 Perkins Avenue
Hans J. Hillerbrand (1959), Ph.D. (Erlangen) <i>Associate Professor of Modern European Christianity</i>	2729 Sevier Street

Frederick R. Hine (1958), M.D. (Yale)	
<i>Associate Professor of Psychiatry</i>	2317 Prince Street
Marie Hinman (1959), M.S. (Florida State)	
<i>Instructor in Psychology</i>	D-2 Westover Park Apartments
Lowell A. Hinrichs (1962), Ph.D. (Oregon)	
<i>Assistant Professor of Mathematics</i>	47 Lebanon Circle
Marcus Edwin Hobbs (1935), Ph.D. (Duke)	
<i>Professor of Chemistry</i>	115 Pinecrest Road
Paul E. Hockstein (1963), Ph.D. (Maryland)	
<i>Assistant Professor of Pharmacology</i>	2027 Bivins Street
Richard Earl Hodel (1965), Ph.D. (Duke)	
<i>Assistant Professor of Mathematics</i>	302 Anderson Street
C. S. Hodges (1963), Ph.D. (Georgia)	505 Pleasants Avenue
<i>Adjunct Associate Professor of Forest Pathology</i>	Cary, N. C.
Charlotte Hogsett (1965), M.A. (Toronto)	
<i>Instructor in Romance Languages</i>	708 Louise Circle
Mrs. Carol Clarke Hogue (1963), M.S.N. (Duke)	
<i>Assistant Professor of Nursing</i>	2913 Welcome Circle
Clyde Nelson Holland (1957), M.S. (Duke)	
<i>Assistant Professor of Civil Engineering</i>	4 Ashley Road
Irving Brinton Holley, Jr. (1947), Ph.D. (Yale)	
<i>Professor of History</i>	2506 Wrightwood Avenue
William Hollister (1956), M.D. (Duke)	Moore County Hospital
<i>Associate in Surgery</i>	Pinehurst, N. C.
Frederic B. M. Hollyday (1956), Ph.D. (Duke)	
<i>Associate Professor of History</i>	1824 Forest Road
Frances Virginia Lee Holton (1947), M.A. (Texas State)	
<i>Associate Professor of Physical Education</i>	407 Erwin Apartments
Calvin Bryce Hoover (1925), Ph.D. (Wisconsin), Litt.D.	
<i>James B. Duke Professor of Economics</i>	1702 Duke University Road
Everett Harold Hopkins (1961), A.M. (Pennsylvania), LL.D.	
<i>Professor of Education</i>	2016 Campus Drive
Edward Charles Horn (1946), Ph.D. (Princeton)	
<i>Professor of Zoology</i>	818 East Forest Hills Boulevard
Paul Horowicz (1961), Ph.D. (Johns Hopkins)	
<i>Associate Professor of Physiology</i>	216 West Woodridge Drive
Theresa Elizabeth Horton (1964), M.S.N.E. (Pittsburgh)	Apartment 3
<i>Assistant Professor of Nursing</i>	810 Clarendon Street
Joseph Kemp Houck (1965), M.A. (Virginia)	400 McCauley Street
<i>Instructor in English</i>	Chapel Hill, N. C.
J. Woodford Howard, Jr. (1962), Ph.D. (Princeton)	
<i>Assistant Professor of Political Science</i>	2617 Princeton Drive
Harold Howe, II (1964), M.A. (Columbia)	204 Glenburnie Street
<i>Adjunct Professor of Education</i>	Chapel Hill, N. C.
William R. Hudson (1961), M.D. (Bowman Gray)	
<i>Professor of Otolaryngology</i>	1102 Englewood Avenue
Alexander Hull (1962), Ph.D. (Washington)	
<i>Assistant Professor of Romance Languages</i>	928 Lambeth Drive
Earle R. Hunt (1964), Ph.D. (Rutgers)	
<i>Assistant Professor of Physics</i>	1030 West Trinity Avenue
Mrs. Wanda Sanborn Hunter (1947), Ph.D. (California)	2723 Brown Avenue
<i>Associate Professor of Zoology</i>	Apartment D, Poplar Apartments
Allan S. Hurlburt (1956), Ph.D. (Cornell)	
<i>Professor of Education</i>	112 Buchanan Boulevard

Mary Martin Huse (1959), Ph.D. (Duke) <i>Assistant Professor of Medical Psychology in Department of Psychiatry and Lecturer in Psychology</i>	Ephesus Chapel Road
O. Kelly Ingram (1959), B.D. (Duke) <i>Associate Professor of Applied Theology</i>	2728 Sevier Street
Wallace Jackson (1965), Ph.D. (Pennsylvania) <i>Assistant Professor of English</i>	1006 West Knox Street
Ann Madeline Jacobansky (1953), M.Ed. (Pittsburgh) <i>Professor of Nursing</i>	1200 Leon Apartments
Peter Walter Jeffs (1964), Ph.D. (Natal) <i>Assistant Professor of Chemistry</i>	3209 Cromwell Road
Marianna Duncan Jenkins (1948), Ph.D. (Byrn Mawr) <i>Associate Professor of Art</i>	402 Buchanan Boulevard
Edward M. Jennings, III (1965), Ph.D. (Wisconsin) <i>Assistant Professor of English</i>	618 Morehead Avenue
Bronislas de Leval Jezierski (1958), Ph.D. (Harvard) <i>Associate Professor of Russian Language and Literature</i>	3800 Hillgrand Drive
John P. Jimenez (1965), M.D. (Medical College of Virginia) <i>Associate in Radiology</i>	1911-C House Avenue, Apartment 55
Frans F. Jobsis (1964), Ph.D. (Michigan) <i>Assistant Professor of Physiology</i>	1542 Hermitage Court
Frederick Charles Joerg (1947), M.B.A. (Harvard) <i>Professor of Economics</i>	2424 Wrightwood Avenue
Charles B. Johnson (1956), Ed.D. (Duke) <i>Associate Professor of Education</i>	2714 McDowell Street
Edward Anthony Johnson (1963), M.D. (Sheffield) <i>Associate Professor of Pharmacology</i>	1408 Shepherd Street
Terry Walter Johnson, Jr. (1954), Ph.D. (Michigan) <i>Professor of Botany</i>	2408 Prince Street
Irwin S. Johnsrude (1966), M.D. (Manitoba) <i>Assistant Professor of Radiology</i>	1022 Gloria Street
John Devereaux Johnston (1962), LL.B. (Duke) <i>Associate Professor of Law</i>	2810 Chelsea Circle
William Webb Johnston (1963), M.D. (Duke) <i>Assistant Professor of Pathology</i>	1025 Monmouth Avenue
Barney L. Jones (1956), B.D., Ph.D. (Duke) <i>Associate Professor of Religion</i>	2622 Pickett Road
Buford Jones (1962), Ph.D. (Harvard) <i>Assistant Professor of English</i>	1216 Clarendon Street
Edward Ellsworth Jones (1953), Ph.D. (Harvard) <i>Professor of Psychology</i>	2738 Sevier Street
James David Jones (1963), M.D. (Duke) <i>Assistant Professor of Psychiatry and Associate in Pediatrics</i>	3851 Somerset Drive
Leon Lloyd Jones (1963), Ph.D. (Utah) <i>Assistant Professor of Chemistry</i>	2610 Indian Trail
Oliver William Jones, Jr. (1963), M.D. (Oklahoma) <i>Assistant Professor of Medicine</i>	Route 1, Erwin Road
Thomas T. Jones (1958), M.D. (Johns Hopkins) <i>Associate in Medicine</i>	2621 Stuart Drive
Archibald Currie Jordan (1925), M.A. (Columbia) <i>Assistant Professor of English</i>	147 Pinecrest Road
Helen Louise Kaiser (1943), R.P.T. (Harvard) <i>Associate Professor of Physical Therapy</i>	1201 Dwire Place

William Arthur Kale (1952), B.D. (Duke)	
<i>Professor of Christian Education</i>	500 East Markham Avenue
Henry Kamin (1948), Ph.D. (Duke)	
<i>Professor of Biochemistry</i>	2417 Perkins Road
Nathan Kaufman (1960), M.D. (McGill)	
<i>Professor of Pathology</i>	2332 Sevier Street
William M. Keane (1964), M.B.A. (Indiana)	
<i>Assistant Professor of Economics</i>	1205 Washington Street
Robert Norman Kearney (1963), Ph.D. (California)	
<i>Assistant Professor of Political Science</i>	415 Carolina Circle
Charles Rush Keith (1963), M.D. (Kansas)	
<i>Assistant Professor of Psychiatry</i>	Route 1, Chapel Hill, N. C.
Thomas F. Keller (1959), Ph.D. (Michigan)	
<i>Associate Professor of Economics</i>	1024 West Markham Avenue
Walter Kempner (1934), M.D. (Heidelberg)	
<i>Professor of Medicine</i>	1505 Virginia Avenue
Patrick Dan Kenan (1965), M.D. (Duke)	
<i>Assistant Professor of Otolaryngology</i>	114 Newell Street
Van Leslie Kenyon, Jr. (1945), M.M.E. (Virginia)	Route 2
<i>Professor of Mechanical Engineering</i>	Hillsborough, N. C.
Grace Pardridge Kerby (1947), M.D. (Duke)	
<i>Professor of Medicine</i>	1108 Wells Street
Alan C. Kerckhoff (1958), Ph.D. (Wisconsin)	
<i>Professor of Sociology</i>	1511 Pinecrest Road
Robert B. Kerr (1965), Ph.D. (Johns Hopkins)	
<i>Associate Professor of Electrical Engineering</i>	2220 Elmwood Avenue
Kaye H. Kilburn (1962), M.D. (Utah)	
<i>Associate Professor of Medicine</i>	1 V.A. Staff Apartments
Seuk Ky Kim (1963), M.D. (Severance)	
<i>Assistant Professor of Radiology</i>	E-2 1200 Leon Street
Gregory Adams Kimble (1952), Ph.D. (Iowa State)	
<i>Professor of Psychology</i>	2513 Wrightwood Avenue
Charles Herschel King (1964), M.D. (Maryland)	
<i>Assistant Professor of Anesthesiology</i>	3212 Sherbon Drive
Thomas DeArman Kinney (1960), M.D. (Duke)	
<i>Professor of Pathology</i>	3120 Devon Road
Kay C. Kintzel (1965), M.S. (Pennsylvania)	26 Flemington Road
<i>Instructor in Nursing</i>	Glen Lenox, Chapel Hill, N. C.
Norman Kirschner (1956), Ph.D. (Pennsylvania State)	
<i>Assistant Professor of Biochemistry</i>	2524 Wrightwood Avenue
Joseph Weston Kitchen, Jr. (1962), Ph.D. (Harvard)	
<i>Assistant Professor of Mathematics</i>	1600 Delaware Avenue
Gunter Klables (1965), B.A. (Freiburg, Germany)	
<i>Instructor in German</i>	801 Underwood Avenue
Robert Frederick Klein (1963), M.D. (Alabama)	
<i>Assistant Professor of Medicine</i>	2119 Englewood Avenue
William Klenz (1947), Ph.D. (North Carolina)	16 Rogerson Drive
<i>Associate Professor of Music</i>	Chapel Hill, N. C.
Gordon K. Klintworth (1964)	
<i>Associate in Pathology</i>	614 Starmount Drive
Peter H. Klopfer (1958), Ph.D. (Yale)	
<i>Associate Professor of Zoology</i>	Route 1, Box 293
Conrad Merton Knight (1961), B.S. (Norwich)	
<i>Associate in Preventive Medicine</i>	4603 Blanchard Road

- Douglas Maitland Knight (1963), Ph.D. (Yale), Litt.D., LL.D., L.H.D.
Professor of English 2138 Campus Drive
- Kenneth Richard Knoerr (1961), Ph.D. (Yale)
Associate Professor of Forest Meteorology 4429 Ryan Road
- Allan Kornberg (1965), Ph.D. (Michigan)
Assistant Professor of Political Science 1639 Marion Avenue
- Wesley Kort (1965), Ph.D. (Chicago)
Instructor in Religion 1514 Edgevale Road
- Jack L. Kostyo (1959), Ph.D. (Cornell)
Associate Professor of Physiology 604 Starmount Drive
- John C. Kouns (1957), D.D.S. (Emory)
Associate in Dentistry Sourwood Drive
 Chapel Hill, N. C.
- Paul Jackson Kramer (1931), Ph.D. (Ohio State)
James B. Duke Professor of Botany 2251 Cranford Drive
- Frederick H. Krantz (1965), A.B. (Columbia)
Instructor in History 1500 Duke University Road
- Edward Kready Kraybill (1939), M.S.E. (Michigan)
Associate Professor of Electrical Engineering 2726 Circle Drive
- Irwin Kremen (1963), Ph.D. (Harvard)
*Assistant Professor of Psychology and Assistant Professor of
 Medical Psychology in the Department of Psychiatry* 216 Forestwood Drive
- Mrs. Juanita M. Kreps (1955), Ph.D. (Duke)
Associate Professor of Economics Morgan Creek Road
 Chapel Hill, N. C.
- William R. Krigbaum (1952), Ph.D. (Illinois)
Professor of Chemistry 2504 Wilson Street
- Robert C. Krueger (1961), D.Phil. (Oxon.)
Assistant Professor of English Route 2, Box 388A
- Arnold D. Krugman (1964), Ph.D. (Kentucky)
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 of Psychiatry and Lecturer in Psychology* 2605 Tanglewood Drive
- W. W. Kulski (1963), LL.D. (Paris)
James B. Duke Professor of Russian Affairs 1624 Marion Avenue
- Sudhir Kumar (1959), Ph.D. (Pennsylvania)
Visiting Associate Professor of Civil Engineering 2014 Sprunt Street
- John G. Kunstmann (1965), Ph.D. (Chicago)
Visiting Professor of German 2 Brandon Road
 Chapel Hill, N. C.
- Johannes A. Kylstra (1965), Ph.D. (Leiden)
Assistant Professor of Medicine and Physiology 2007 House Avenue
- Mrs. Maurine Boie La Barre (1961), M.S.W. (Bryn Mawr)
Assistant Professor of Psychiatric Social Work Mt. Sinai Road, Route 1
- Weston La Barre (1946), Ph.D. (Yale)
Professor of Anthropology Mt. Sinai Road, Route 1
- Leon Lack (1965), Ph.D. (Columbia)
Assistant Professor of Pharmacology 1521 Hermitage Court
- Creighton Lacy (1953), B.D., Ph.D. (Yale)
Professor of World Christianity 2714 Dogwood Road
- Martin Lakin (1958), Ph.D. (Chicago)
*Associate Professor of Medical Psychology in Department of
 Psychiatry and Associate Professor of Psychology* 2709 McDowell Street
- Elizabeth A. Lamb (1965), M.D. (Tennessee)
Associate in Pediatrics 22 Four Seasons Apartments
- Thomas A. Langford (1956), B.D., Ph.D. (Duke)
Associate Professor of Religion 2002 Dartmouth Drive

John Tate Lanning (1927), Ph.D. (California)	
<i>James B. Duke Professor of History</i>	3007 Surrey Road
John E. Larsh, Jr. (1943), Sc.D. (Johns Hopkins)	Memorial Hospital
<i>Professor of Parasitology</i>	Chapel Hill, N .C.
Arthur Larson (1958), D.C.L. (Oxon.)	
<i>Professor of Law</i>	3408 Dover Road
John Laszlo (1960), M.D. (Harvard)	
<i>Associate Professor of Medicine</i>	Cornwallis Road
Elvin Remus Latty (1937), J.Sc.D. (Columbia)	
<i>William R. Perkins Professor of Law</i>	3620 Hathaway Road
Patricia Lawrence (1964), M.A. (Columbia)	
<i>Assistant Professor</i>	2318 Broad Street
Richard H. Leach (1955), Ph.D. (Princeton)	
<i>Professor of Political Science</i>	1313 Woodburn Road
John LeBar (1965), M.S. (Kansas State Teachers College)	
<i>Assistant Professor of Physical Education</i>	923 Demerius Street
Harold E. Lebovitz (1962), M.D. (Pittsburgh)	
<i>Associate Professor of Medicine</i>	1900 Dartmouth Drive
John C. LeMay (1961), D.V.M. (Georgia)	Goodwin Road
<i>Assistant Professor of Veterinary Medicine</i>	Route 2, Box 214
Warren Lerner (1961), Ph.D. (Columbia)	
<i>Associate Professor of History</i>	2104 Dartmouth Drive
Richard G. Lester (1965), M.D. (Columbia)	
<i>Professor of Radiology</i>	1511 Pinecrest Avenue
Donald S. Leventhal (1965), Ph.D. (Purdue)	
<i>Associate in Medical Psychology</i>	1802 Hillcrest Drive
Harold Walter Lewis (1946), Ph.D. (Duke)	
<i>Professor of Physics</i>	2307 Sprunt Street
Jack Lewis (1965), M.A. (Ohio State)	
<i>Instructor of Political Science</i>	1749 Morehead Avenue
Martha Modena Lewis (1933), M.A. (Columbia)	
<i>Professor of Physical Education</i>	407 Erwin Apartments
Ralph Elton Lewis (1941), M.S. in M.E. (Illinois)	
<i>Assistant Professor of Mechanical Engineering</i>	1401 Alabama Avenue
John L. Lievsay (1962), Ph.D. (Washington)	
<i>Professor of English</i>	1123 Woodburn Drive
Edwin Jacob Lilly (1965), M.D. (Ohio State)	
<i>Assistant Professor of Anesthesiology</i>	2957 Welcome Drive
Darwyn E. Linder (1965), Ph.D. (Minnesota)	
<i>Assistant Professor of Psychology</i>	2727 Sparger Road
L. Sigfred Linderoth (1965), M.E. (Iowa State)	
<i>Professor of Mechanical Engineering</i>	2220 Whitley Drive
Charles Harris Livengood, Jr. (1946), LL.B. (Harvard)	
<i>Professor of Law</i>	2804 Chelsea Circle
Daniel A. Livingston (1956), Ph.D. (Yale)	
<i>Associate Professor of Zoology</i>	626 Starmount Drive
Charles E. Llewellyn, Jr. (1955), M.D. (Medical College of Virginia)	
<i>Associate Professor of Psychiatry</i>	3550 Hamstead Court
Jane Marie Lloyd (1961), M.A. (North Carolina)	
<i>Assistant Professor of Physical Education</i>	706 Louise Circle
Gregory Lockheed (1965), Ph.D. (Johns Hopkins)	
<i>Assistant Professor of Psychology</i>	101 Emerald Circle
Arthur Hill London, Jr. (1932), M.D. (Pennsylvania)	
<i>Assistant Professor of Pediatrics</i>	808 Wells Street

- Ernest Croft Long (1956), M.B., B.S., Ph.D. (London)
Associate Professor of Physiology and Pharmacology,
Associate Professor of Preventive Medicine, and
Associate in Pediatrics Box 204B, Route 1, Erwin Road
- Hans Löwenbach (1940), M.D. (Hamburg)
Professor of Psychiatry and Assistant
Professor of Pediatrics Route 3, Box 309, Old Apex Road
- Charles Lucien Baker Lowndes (1934), S.J.D. (Harvard)
James B. Duke Professor of Law 2016 Club Boulevard
- Zolton J. Lucas (1965), M.D. (Johns Hopkins)
Assistant Professor of Surgery 126 Pinecrest Road
- Charles T. Ludington, Jr. (1963), M.A. (Duke)
Instructor in Remedial English in the Divinity School 3012 Mossdale Street
- William S. Lynn, Jr. (1954), M.D. (Columbia)
Professor of Medicine and Associate Professor of Biochemistry 4014 Bristol Road
- George W. Lynts (1965), Ph.D. (Wisconsin)
Professor of Geology 925 Jones Circle
- Angus M. McBryde (1931), M.D. (Pennsylvania)
Professor of Pediatrics 3406 Westover Road
- Kenneth Scott McCarty (1959), Ph.D. (Columbia)
Associate Professor of Biochemistry 2713 Dogwood Road
- Richard V. McCloskey (1965), M.D. (Rochester)
Associate in Medicine 2709 Farthing Street
- Thomas S. McCollough (1961), Th.D. (Southern Baptist Theological Seminary)
Assistant Professor of Religion 2227 Cranford Road
- Donald E. McCollum (1962), M.D. (Bowman Gray)
Assistant Professor of Orthopedic Surgery 2207 Wilshire Drive
- William Charles McCormack (1964), Ph.D. (Chicago)
Associate Professor of Sociology 1326 Welcome Circle
- Alice L. McCrea (1961), M.S. (Chicago)
Assistant Professor of Radiation Therapy 2004 Cole Mill Road
- Betty Foster McCue (1964), Ph.D. (Iowa State)
Professor of Physical Education 3349 Denise Street
- Shaun A. McDowell (1965), M.B., B.Ch. (Queen's University, Belfast)
Associate in Anesthesiology 531 Green Street
- Frederick D. McFalls (1962), M.D. (Duke)
Assistant Professor of Anatomy 911 Morehead Avenue
- John S. McGee (1962), Ph.D. (Vanderbilt)
Professor of Economics 2704 Sevier Street
- Gelolo McHugh (1946), Ph.D. (Columbia)
Associate Professor of Psychology 1010 Monmouth Avenue
- Henry Deane McIntosh (1955), M.D. (Pennsylvania)
Professor of Medicine 2705 Stuart Drive
- John C. McKinney (1957), Ph.D. (Michigan)
Professor of Sociology and Professor of Medical
Sociology in Department of Psychiatry 1627 Marion Avenue
- Mary Helen McLachlan (1958), M.A. (Missouri)
Associate Professor of Dietetics 2022 Bivins Street
- Thomas Joseph McManus (1961), M.D. (Boston)
Assistant Professor of Physiology and Pharmacology 1408 Oakland Avenue
- Harry Thurman McPherson (1955), M.D. (Duke)
Associate Professor of Medicine 3200 Oxford Drive
- Samuel D. McPherson, Jr. (1949), M.D. (Johns Hopkins)
Associate in Ophthalmology 29 Oak Drive

John Nelson Macduff (1956), M.M.E. (New York) <i>Professor of Mechanical Engineering</i>	2733 Dogwood Road
George L. Maddox (1960), Ph.D. (Michigan State) <i>Professor of Sociology and Professor of Medical Sociology in Department of Psychiatry</i>	2750 McDowell Street
Moses S. Mahaley (1965), Ph.D. (Duke) <i>Assistant Professor of Neurology and Assistant Professor of Anatomy</i>	3534 Hamstead Court
Edward P. Mahoney (1965), M.A. (Columbia) <i>Assistant Professor of Philosophy</i>	918 Monmouth Avenue
Alan Krebs Manchester (1929), Ph.D. (Duke) <i>Professor of History</i>	406 Swift Avenue
Addison G. Mangum (1965), M.D. (North Carolina) <i>Associate in Radiology</i>	S 40B Dogwood Drive Chapel Hill, N. C.
Joseph Eldridge Markee (1943), Ph.D. (Chicago) <i>James B. Duke Professor of Anatomy</i>	1015 Demerius Street
Sidney David Markman (1947), Ph.D. (Columbia) <i>Professor of Art History and Archaeology</i>	919 Urban Avenue
George Eric Marler (1963), M.D.C.M. (McGill) <i>Associate in Medicine and Associate in Biochemistry</i>	177 Larch Road Briarcliff Manor, N. Y.
Arthur M. Martin (1965), M.D. (Duke) <i>Associate in Pathology</i>	1916 Cole Mill Road
Robert M. Marsh (1965), Ph.D. (Columbia) <i>Associate Professor of Sociology</i>	2725 Sevier Street
David V. Martin (1962), Ed.D. (Duke) <i>Assistant Professor of Education</i>	2312 Wilson Street
Raymond Massengill, Jr. (1964), Ph.D. (Virginia) <i>Associate in Medical Speech Pathology in the Department of Surgery</i>	2206 Guess Road
Seymour Mauskopf (1964), M.A. (Princeton) <i>Instructor in History</i>	1700 Hillcrest Drive
William Cary Maxwell (1930), Ph.D. (Heidelberg) <i>Associate Professor of German</i>	142 Pinecrest Road
Demmie G. Mayfield (1964), M.D. (Texas) <i>Assistant Professor of Psychiatry</i>	Apartment 3-301 West Trinity Avenue
Peter Meekison (1964), M.A. (Western Ontario) <i>Visiting Assistant Professor of Political Science</i>	2507 Pickett Road
Otto Meier, Jr. (1934), Ph.D. (Pennsylvania) <i>Professor of Electrical Engineering</i>	113 Pinecrest Road
Elgin W. Mellown (1965), Ph.D. (London) <i>Assistant Professor of English</i>	3214 Duke Homestead Road
Elijah Eugene Menefee, Jr. (1940), M.D. (Duke) <i>Professor of Medicine</i>	2205 Cranford Road
Robert J. Menzies (1962), Ph.D. (California) <i>Professor of Zoology</i>	Mitchell Village Beaufort, N. C.
James L. Meriam (1963), Ph.D. (Yale) <i>Professor of Engineering Mechanics</i>	3434 Rugby Road
Richard S. Metzgar (1962), Ph.D. (Buffalo) <i>Associate Professor of Immunology</i>	3613 Westover Road
Horst Meyer (1959), Docteur ès Sciences (Geneva) <i>Professor of Physics</i>	1411 Anderson Street
M. Victor Michalak (1950), Ph.D. (Indiana) <i>Assistant Professor of English</i>	804 Louise Circle
Gustavus H. Miller (1955), Ph.D. (Michigan) <i>Assistant Professor of Romance Languages</i>	Bartram Drive Chapel Hill, N. C.

Wilma A. Minniear (1964), M.S.N. (Western Reserve)	
<i>Associate Professor of Nursing</i>	212 East Markham Avenue
Margaret Elizabeth Mitchell (1957), M.Ed. (North Carolina State)	
<i>Instructor in Nursing</i>	2728 Brown Avenue
Gerald C. Monsman (1965), Ph.D. (Johns Hopkins)	Apartment 6
<i>Assistant Professor of English</i>	Philip Apartments, 307 West Trinity Avenue
Donald M. Monson (1962), M.D. (Wisconsin)	
<i>Adjunct Assistant Professor of Radiology</i>	2615 Stuart Drive
John W. Moore (1961), Ph.D. (Virginia)	Kenmore Road
<i>Professor of Physiology</i>	Chapel Hill, N. C.
William Hamilton Moore (1963), Ph.D. (Harvard)	
<i>Assistant Professor of English</i>	2802 Erwin Road
James Joseph Morris (1963), M.D. (New York State)	
<i>Associate in Medicine</i>	3711 Tremont Drive
Montrose J. Moses (1959), Ph.D. (Columbia)	
<i>Associate Professor of Anatomy</i>	152 Pinecrest Road
Earl George Mueller (1945), Ph.D. (Iowa)	
<i>Associate Professor of Art</i>	1001 Gloria Avenue
Mrs. Julia Wilkinson Mueller (1939-41; 1946), M.A. (Iowa)	
<i>Professor of Music</i>	1001 Gloria Avenue
Daniel F. Murphy (1966), Ph.D. (Rochester)	
<i>Associate in Medical Psychology</i>	
Francis J. Murray (1960), Ph.D. (Columbia)	
<i>Professor of Mathematics</i>	1011 Homer Street
A. Wendell Musser (1963), M.D. (Indiana)	
<i>Assistant Professor of Pathology</i>	2403 Wrightwood Avenue
Toshio Narahashi (1965), Ph.D. (Tokyo)	
<i>Assistant Professor of Physiology</i>	891 Louise Circle
Thomas H. Nash, Jr. (1959), B.S.M.E. (Iowa State)	
<i>Assistant Professor of Mechanical Engineering</i>	2527 Wrightwood Avenue
Blaine S. Nashold, Jr. (1957), M.D. (McGill)	
<i>Assistant Professor of Surgery in Division of Neurosurgery</i>	410 East Forest Hills Boulevard
Dorothy E. Naumann (1963), M.D. (Syracuse)	
<i>Associate in Preventive Medicine</i>	210 Faculty Apartments
Aubrey Willard Naylor (1952), Ph.D. (Chicago)	
<i>Professor of Botany</i>	2430 Wrightwood Avenue
Thomas Herbert Naylor (1964), Ph.D. (Tulane)	
<i>Assistant Professor of Economics</i>	B1-1200 Leon Street
George Neece (1965), Ph.D. (Duke)	
<i>Visiting Assistant Professor of Chemistry</i>	Route 1, Box 253-B
Stanley S. Needell (1965), M.D. (Virginia)	
<i>Assistant Professor of Psychiatry</i>	2910 Buckingham Road
Glenn Robert Negley (1946), Ph.D. (Chicago)	
<i>Professor of Philosophy</i>	3610 Hathaway Road
Roland H. Nelson (1965), Ed.D. (Harvard)	
<i>Professor of Education</i>	2431 Tryon Road
M. Wilson Nesbitt, Jr. (1957), B.D. (Duke)	
<i>Associate Professor of the Work of the Rural Church</i>	1609 Peace Street
Charles W. Neville, Jr. (1964), M.D. (Vanderbilt)	Highland Hospital
<i>Assistant Professor of Psychiatry</i>	Asheville, N. C.
Barbara Carol Newborg (1952), M.D. (Johns Hopkins)	
<i>Associate in Medicine</i>	1503 Virginia Avenue
Henry Winston Newson (1948), Ph.D. (Chicago)	
<i>Professor of Physics</i>	1111 North Gregson Street

Claude R. Nichols, Jr. (1958), M.D. (Baylor)	
<i>Associate Professor of Psychiatry</i>	1114 Woodburn Road
William McNeal Nicholson (1935), M.D. (Johns Hopkins)	
<i>Professor of Medicine</i>	824 Anderson Street
R. Bruce Nicklas (1965), Ph.D. (Columbia)	
<i>Associate Professor of Zoology</i>	2012 Jersey Avenue
Walter McKinley Nielsen (1925), Ph.D. (Minnesota)	
<i>James B. Duke Professor of Physics</i>	139 Pinecrest Road
Nancy Nolan (1964), M.Sc. (Ohio State)	
<i>Instructor in Nursing</i>	705 Louise Circle
Owen L. Norment, Jr. (1965), Th.M. (Union Theological Seminary)	
<i>Instructor in American Christianity</i>	942-A Lambeth Circle
Sue Norville (1966), M.S.N. (Emory)	
<i>Assistant Professor of Nursing</i>	705 Louise Circle
Holgar Olof Nygard (1960), Ph.D. (California)	
<i>Professor of English</i>	Route 2, Cole Mill Road
Walter D. Obrist (1957), Ph.D. (Northwestern)	
<i>Professor of Medical Psychology in Department of Psychiatry and Lecturer in Psychology</i>	2604 McDowell Street
Guy Leary Odom (1943), M.D. (Tulane)	
<i>Professor of Neurosurgery</i>	2812 Chelsea Circle
William M. O'Fallon (1965), Ph.D. (Vanderbilt)	Glen Heights
<i>Assistant Professor of Preventive Medicine</i>	Chapel Hill, N. C.
Richard T. Oldham (1962), M.A. (Washington), Major, U.S.A.F.	
<i>Associate Professor of Air Science</i>	2020 Hillandale Road
Billy Brown Olive (1960), B.S.E.E., LL.B. (St. Johns)	
<i>Lecturer in Electrical Engineering</i>	Box 280-2, Route 1
F. Hodge O'Neal (1959), S.J.D. (Harvard)	
<i>Professor of Law</i>	Box 284A, Mt. Sinai Road
Henry J. Oosting (1932), Ph.D. (Minnesota)	
<i>Professor of Botany</i>	2642 University Drive
Edward Stewart Orgain (1934), M.D. (Virginia)	
<i>Professor of Medicine</i>	3321 Devon Road
Robert Tappan Osborn (1954), B.D., Ph.D. (Drew)	
<i>Associate Professor of Religion</i>	2732 McDowell Street
James G. Osborne (1961), B.S. (California)	
<i>Professor of Forest Biometry</i>	2756 McDowell Street
Suydan Osterhout (1959), M.D., Ph.D. (Rockefeller Institute)	
<i>Assistant Professor of Medicine and Associate Professor of Microbiology</i>	600 Starmount Drive
Athos Ottolenghi (1959), M.D. (Tavia)	
<i>Associate Professor of Pharmacology</i>	918 Green Street
Harry Ashton Owen, Jr. (1961), Ph.D. (North Carolina State)	
<i>Professor of Electrical Engineering</i>	2741 McDowell Street
George Padilla (1965), Ph.D. (California)	340 West Vanderbilt
<i>Assistant Professor of Physiology</i>	Oak Ridge, Tennessee
Aubrey Edwin Palmer (1944), B.S., C.E. (Virginia)	
<i>Associate Professor of Civil Engineering</i>	2525 Highland Avenue
Harold Talbot Parker (1939), Ph.D. (Chicago)	
<i>Professor of History</i>	923 Dacian Avenue
Roy T. Parker (1954), M.D. (Virginia)	
<i>Professor of Obstetrics and Gynecology</i>	111 Pinecrest Road
Suzanne Lowry Parks (1964), M.S.N. (Maryland)	
<i>Assistant Professor of Nursing</i>	Route 2, Box 384A

Harry B. Partin (1964), Ph.D. (Chicago) <i>Assistant Professor of Religion</i>	2739 Spencer Street
Joel Francis Paschal (1954), Ph.D. (Princeton) <i>Professor of Law</i>	1527 Pinecrest Road
Merrell Lee Patrick (1964), Ph.D. (Carnegie Institute of Technology) <i>Assistant Professor of Mathematics</i>	A-4 1200 Leon Street
Ransom Rathbone Patrick (1954), Ph.D. (Princeton) <i>Professor of Art History</i>	116 Pinecrest Road
Lewis Patton (1926), Ph.D. (Yale) <i>Professor of English</i>	614 Swift Avenue
George W. Paulson (1964), M.D. (Duke) <i>Assistant Professor of Neurology</i>	3419 Redbud Avenue Raleigh, N. C.
Hilda I. Pavlov (1960), M.A. (Leningrad) <i>Assistant Professor of Russian</i>	709 Reta Road
Michael I. Pavlov (1960), M.A. (Leningrad) <i>Assistant Professor of Russian</i>	709 Reta Road
William Bernard Peach (1951), Ph.D. (Harvard) <i>Professor of Philosophy</i>	920 Dacian Avenue
Ivan Lee Peacock (1964), M.D. (Vanderbilt) <i>Associate in Pathology</i>	Ashley Road
George W. Pearsall (1964), Sc.D. (Massachusetts Institute of Technology) <i>Associate Professor of Mechanical Engineering</i>	2941 Welcome Drive
Talmadge Lee Peele (1939), M.D. (Duke) <i>Professor of Anatomy, Associate Professor of Neurology, Assistant Professor of Medicine, Assistant Professor of Pediatrics, and Lecturer in Psychology</i>	KD2 University Apartments
Charles Henry Peete, Jr. (1953), M.D. (Harvard) <i>Associate Professor of Obstetrics and Gynecology</i>	42 Beverly Drive
William P. J. Peete (1955), M.D. (Harvard) <i>Associate Professor of Surgery</i>	2814 Chelsea Circle
Jacques H. Perivier (1965), Ph.D. (Pennsylvania) <i>Assistant Professor of Romance Languages</i>	Four Seasons Apartments 1911 House Avenue
Harold Sanford Perry (1932), Ph.D. (Cornell) <i>Professor of Botany</i>	2302 Cranford Road
Edythe Mae Persing (1964), M.N. (Western Reserve) <i>Assistant Professor of Nursing</i>	Route 2, Chapel Hill, N. C.
Elbert Lapsley Persons (1930), M.D. (Harvard) <i>Professor of Medicine and Associate Professor of Preventive Medicine and Public Health</i>	723 Anderson Street
Walter Scott Persons (1930), A.B. (Duke) <i>Associate Professor of Physical Education</i>	612 Swift Avenue
Ernst Peschel (1953), M.D. (Berlin) <i>Associate Professor of Medicine</i>	2306 Pershing Street
Anton Peterlin (1961), Ph.D. (Berlin) <i>Adjunct Professor of Chemistry</i>	1212 Arnette Avenue
Robert Francis Pethia (1961), M.B.A. (Ohio State) <i>Assistant Professor of Economics</i>	1609 Hollywood Street
Ray C. Petry (1937), Ph.D. (Chicago) <i>James B. Duke Professor of Church History</i>	128 Pinecrest Road
Olan Lee Petty (1952), Ph.D. (Iowa) <i>Professor of Education</i>	2605 McDowell Street
John Bernard Pfeiffer, Jr. (1949), M.D. (Cornell) <i>Associate Professor of Medicine</i>	3414 Rugby Road
Leland R. Phelps (1961), Ph.D. (Ohio State) <i>Associate Professor of German</i>	2255 Cranford Road

Frances C. Phillips (1965), M.S. (North Carolina) <i>Instructor in Nursing</i>	5 Powell Street Chapel Hill, N. C.
James Henry Phillips (1946), Ph.D. (Yale) <i>Associate Professor of Religion</i>	2517 Perkins Road
Roberta Phillips (1965), M.S.N.E. (North Carolina) <i>Instructor in Nursing</i>	700 Fidelity Street
Jane Philpott (1951), Ph.D. (Iowa State) <i>Associate Professor of Botany</i>	2260 Cranford Road
Henry Floyd Pickett (1935), A.B. <i>Associate in Medical Art and Illustration and Photographer</i>	1212 West Cornwallis Road
Kenneth LeRoy Pickrell (1944), M.D. (Johns Hopkins) <i>Professor of Plastic Surgery</i>	3 Sylvan Road
Orrin H. Pilkey (1965), Ph.D. (Florida) <i>Assistant Professor of Geology</i>	3109 Sherbon Drive
Theo Clyde Pilkington (1961), Ph.D. (Duke) <i>Assistant Professor of Electrical Engineering</i>	4725 Stafford Drive
Felix J. Pircher (1962), M.D. (Innsbruck) <i>Assistant Professor of Radiology</i>	1200 Leon Street
Jacques C. Poirier (1955), Ph.D. (Chicago) <i>Associate Professor of Chemistry</i>	210 West Lavender Street
F. Stanley Porter (1964), M.D. (Johns Hopkins) <i>Associate Professor of Pediatrics</i>	2607 Cornwallis Road
Richard M. Portwood (1959), M.D. (Southwestern) <i>Assistant Professor of Medicine and Assistant Professor of Preventive Medicine</i>	1720 Vista Street
Raymond W. Postlethwait (1955), M.D. (Duke) <i>Professor of Surgery</i>	1513 Pinecrest Road
William H. Poteat (1960), B.D., Ph.D. (Duke) <i>Associate Professor of Christianity and Culture</i>	621 Greenwood Road Chapel Hill, N. C.
Albert H. Powell, Jr. (1965), M.D. (Duke) <i>Associate in Psychiatry</i>	3429 Dover Road
Benjamin E. Powell (1946), Ph.D. (Chicago) <i>Professor in the Faculty of Arts and Sciences</i>	3609 Hathaway Road
Vernon Pratt (1964), M.F.A. (San Francisco Art Institute) <i>Instructor in Art</i>	Route 1, Erwin Road
Richard Lionel Predmore (1950), D.M.L. (Middlebury) <i>Professor of Romance Languages</i>	2535 Sevier Street
Jack J. Preiss (1959), Ph.D. (Michigan State) <i>Associate Professor of Sociology and Associate Professor of Medical Sociology in Department of Psychiatry</i>	2722 McDowell Street
Richard A. Preston (1965), Ph.D. (Yale) <i>William K. Boyd Professor of History</i>	814 Onslow Street
James Ligon Price, Jr. (1952), Ph.D. (Cantab.) <i>Professor of Religion</i>	2723 Circle Drive
Reynolds Price (1958), B.Litt. (Oxon.) <i>Assistant Professor of English</i>	Box 4813 Duke Station
Jesse Harris Proctor, Jr. (1958), Ph.D. (Harvard) <i>Associate Professor of Political Science</i>	613 Swift Avenue
Ruth Register Proctor (1964), M.S.N. (Duke) <i>Assistant Professor of Nursing</i>	2417 Dellwood Street
Louis D. Quin (1956), Ph.D. (North Carolina) <i>Associate Professor of Chemistry</i>	2740 McDowell Street
Gaylin W. Quinn (1957), D.D.S. (Tennessee) <i>Professor of Orthodontics</i>	806 East Forest Hills Boulevard

Milton Raben (1964), M.D. (Tufts) <i>Assistant Professor of Radiation Therapy</i>	2532 Wrightwood Avenue
Charles William Ralston (1953), Ph.D. (Duke) <i>Professor of Forest Soils</i>	2531 Wrightwood Avenue
Dale B. J. Randall (1957), Ph.D. (Pennsylvania) <i>Assistant Professor of English</i>	2620 University Drive
Robert Stanley Rankin (1927), Ph.D. (Princeton) <i>Professor of Political Science</i>	1227 Vickers Avenue
Israel Thomas Reamer (1931), Ph.D. (Maryland) <i>Associate in Pharmacy</i>	2406 West Club Boulevard
Kenneth James Reardon (1947), M.A. (Boston) <i>Associate Professor of English</i>	2821 Winton Road
John B. Reckless (1963), M.D. (Birmingham) <i>Assistant Professor of Psychiatry</i>	2437 Tryon Road
Wallace E. Reed (1965), M.S. (Illinois) <i>Assistant Professor of Economics</i>	2610 Sevier Street
Robert James Reeves (1930), M.D. (Baylor) <i>Professor of Radiology</i>	920 Anderson Street
Barbara Z. Renkin (1963), Ph.D. (Johns Hopkins) <i>Associate in Physiology</i>	2809 Legion Avenue
Eugene M. Renkin (1963), Ph.D. (Harvard) <i>Professor of Pharmacology and Head of the Division of Pharmacology in Department of Physiology and Pharmacology</i>	2809 Legion Avenue
Thomas D. Reynolds (1953), Ph.D. (Duke) <i>Associate Professor of Mathematics</i>	2502 Wrightwood Avenue
John McFarlane Rhoads (1956), M.D. (Temple) <i>Professor of Psychiatry and Lecturer of Pastoral Care in Divinity School</i>	2404 Prince Street
Reed P. Rice (1965), M.D. (Indiana) <i>Assistant Professor of Radiology</i>	716 Kenmore Road Chapel Hill, N. C.
Lawrence Richardson, Jr. (1966), Ph.D. (Yale) <i>Professor of Latin</i>	
Robert Coleman Richardson (1965), M.S. (Virginia Polytechnic Institute) <i>Instructor in Physics</i>	203½ East Maynard Avenue
McMurry S. Richey (1954), B.D., Ph.D. (Duke) <i>Professor of Theology and Christian Nurture</i>	2725 Dogwood Road
Mac L. Ricketts (1965), Ph.D. (Chicago) <i>Instructor in Religion</i>	2007 Ruffin Street
John D. Riebel (1962), M.A. <i>Associate in Physical Therapy</i>	60 Oakwood Drive Chapel Hill, N. C.
Nancy A. Riecham (1965), M.S.N. (Indiana) <i>Instructor in Nursing</i>	Town House Apartments 26 301 Swift Avenue
Dana Phelps Ripley (1959), Ph.D. (North Carolina) <i>Assistant Professor of Romance Languages</i>	2724 Erwin Road, 1-B
Nathan Russell Roberson (1963), Ph.D. (Johns Hopkins) <i>Assistant Professor of Physics</i>	1511 North Duke Street
John Henderson Roberts (1931), Ph.D. (Texas) <i>Professor of Mathematics</i>	2813 Legion Avenue
Charles K. Robinson (1961), B.D., Ph.D. (Duke) <i>Assistant Professor of Philosophical Theology</i>	126 Emerald Circle
Hugh G. Robinson (1964), Ph.D. (Duke) <i>Associate Professor of Physics</i>	2749 McDowell Street
Randal Fink Robinson (1963), A.B. (Washington and Lee) <i>Instructor in English</i>	4816 Stafford Drive

Roscoe R. Robinson (1962), M.D. (Oklahoma) <i>Associate Professor of Medicine</i>	2503 Vineyard Street
Charles A. Rogers (1965), B.D. (Perkins School of Theology) <i>Instructor in Historical Theology</i>	2834 Stuart Drive
Robert Samuel Rogers (1937), Ph.D. (Princeton), F.A.A.R. <i>Professor of Latin</i>	148 Pinecrest Road
Theodore Ropp (1938), Ph.D. (Harvard) <i>Professor of History</i>	302 East Woodridge Drive
Theodore Rosett (1959), Ph.D. (London) <i>Associate in Biochemistry</i>	1713 James Street
J. Bowen Ross, Jr. (1965), LL.B. (Duke), B.S.M.E. (Duke) <i>Lecturer in Electrical Engineering</i>	2411 Alpine Road
Norman F. Ross (1937), D.D.S. (Temple) <i>Associate Professor of Dentistry</i>	2811 Chelsea Circle
Simon Rottenberg (1965), Ph.D. (Harvard) <i>Professor of Economics</i>	1601 Hermitage Court
William Leal Rowe (1963), Ph.D. (Cornell) <i>Associate Professor of Anthropology</i>	2206 University Drive
Donald Francis Roy (1950), Ph.D. (Chicago) <i>Associate Professor of Sociology</i>	604 North Gregson Street
John Jesse Rudin, II (1945), B.D., Ph.D. (Northwestern) <i>Associate Professor of Speech and Worship</i>	1640 Marion Street
Mabel F. Rudisill (1948), Ph.D. (Wisconsin) <i>Associate Professor of Education</i>	2121 Woodrow Street
Julian Meade Ruffin (1930), M.D. (Virginia) <i>Professor of Medicine</i>	816 Anderson Street
Max R. Rumelhart (1965), B.Ed. (Gonzaga) <i>Assistant Professor of Naval Science</i>	3527 Racine Street
Ralph Wayne Rundles (1945), M.D., Ph.D. (Cornell) <i>Professor of Medicine</i>	132 Pinecrest Road
David Coston Sabiston, Jr. (1964), M.D. (Johns Hopkins) <i>Professor of Surgery</i>	3309 Dixon Road
Harvey J. Sage (1964), Ph.D. (Yale) <i>Associate Professor of Pathology and Associate Professor of Biochemistry</i>	1304 Leon Street
Herman Salinger (1955), Ph.D. (Yale) <i>Professor of German</i>	3444 Rugby Road
Herbert A. Saltzman (1958), M.D. (Philadelphia) <i>Associate Professor of Medicine</i>	2728 McDowell Street
John Salzano (1958), Ph.D. (Iowa State) <i>Associate Professor of Physiology</i>	607 Starmount Drive
Wiley Mitchell Sams (1963), M.D. (Emory) <i>Associate in Dermatology</i>	2210 Sparger Road
Aaron P. Sanders (1956), Ph.D. (North Carolina) <i>Associate Professor of Radiology</i>	2207 Elder Street
Charles Richard Sanders (1937), Ph.D. (Chicago) <i>Professor of English</i>	103 Pinecrest Road
Baxter B. Sapp, Jr. (1960), D.D.S. (Temple) <i>Associate in Dentistry</i>	3514 Rugby Road
Mrs. Eugenia Curtis Saville (1947), M.A. (Columbia) <i>Associate Professor of Music</i>	1103 Anderson Street
Lloyd Blackstone Saville (1946), Ph.D. (Columbia) <i>Professor of Economics</i>	1103 Anderson Street
John Henry Saylor (1928), Ph.D. (Duke) <i>Professor of Chemistry</i>	2500 Perkins Road

Herman Max Schiebel (1939), M.D. (Johns Hopkins)	
<i>Associate in Surgery</i>	1020 Anderson Street
Harold Schiffman (1963), Ph.D. (Princeton)	
<i>Assistant Professor of Psychology</i>	3415 Hope Valley Road
John G. Schlogl (1963), A.M. (Columbia) Lt. Col., U.S.A.F.	
<i>Professor of Air Science</i>	132 Radcliffe Circle
Knut Schmidt-Nielsen (1952), Ph.D. (Copenhagen)	
<i>James B. Duke Professor of Physiology</i>	Apartment 32
<i>in the Department of Zoology</i>	301 Swift Avenue
Peter Schonbach (1963), Ph.D. (Minnesota)	
<i>Visiting Associate Professor of Psychology</i>	2401 West Club Boulevard
Fred W. Schoonmaker (1965), M.D. (Colorado)	
<i>Associate in Medicine</i>	1311 Anderson Street
Daniel M. Schores (1965), Ph.D. (Missouri)	
<i>Assistant Professor of Church and Community</i>	909 Green Street
David Peter Schorr, Jr. (1962), M.A.T. (Duke)	104 Laurel Hill Road
<i>Instructor in Mathematics</i>	Chapel Hill, N. C.
Nathan Schupper (1960), D.D.S. (Pittsburgh)	
<i>Associate in Dentistry</i>	2802 Welcome Drive
Charlene H. Schwab (1965), M.S.N. (Indiana)	
<i>Instructor in Nursing</i>	301 Swift Avenue
Esther Louise Schwerman (1947), Ph.D. (Northwestern)	
<i>Assistant Professor of English</i>	909 Lambeth Circle
Anne Firor Scott (1961), Ph.D. (Radcliffe)	1028 Highland Woods
<i>Associate Professor of History</i>	Chapel Hill, N. C.
William Evans Scott (1958), Ph.D. (Yale)	
<i>Associate Professor of History</i>	1311 Dollar Avenue
Richard A. Scoville (1961), Ph.D. (Yale)	
<i>Assistant Professor of Mathematics</i>	905 Exum Street
Will Camp Sealy (1946), M.D. (Emory)	
<i>Professor of Thoracic Surgery</i>	2232 Cranford Road
Reihard B. Searles (1965), Ph.D. (California)	
<i>Assistant Professor of Botany</i>	119 West Lynch Street
Donald E. Seim (1965), M.D. (Medical College of Virginia)	
<i>Associate in Radiology</i>	2213 Morehead Avenue
James Hustead Semans (1953), M.D. (Johns Hopkins)	
<i>Professor of Urology</i>	1415 Bivins Street
James N. Settle (1962), Ph.D. (North Carolina)	
<i>Assistant Professor of Classical Studies</i>	2314 Woodrow Street
Walter E. Sewell (1965), Ph.D. (Harvard)	
<i>Adjunct Professor of Mathematics</i>	1411 Woodland Drive
Richard K. Seymour (1958), Ph.D. (Pennsylvania)	
<i>Associate Professor of German</i>	1311 Carolina Avenue
Donald S. Shannon (1965), M.B.A. (Chicago)	
<i>Instructor in Economics</i>	4012 Hillgrand Drive
Trevor Ian Shaw (1966), Ph.D. (Contab.)	
<i>Visiting Professor of Zoology</i>	Apartment 32, 1000 Duke Street
Frederick Gayle Sheppard (1962), B.S. (Duke)	
<i>Instructor in Civil Engineering</i>	A-5 Westover Park Apartments
Bobby Foster Sherwood (1965), D.V.M. (Georgia)	
<i>Associate in Veterinary Medicine</i>	1107 Glendale Avenue
Melvin G. Shimm (1953), LL.B. (Yale)	
<i>Professor of Law</i>	2429 Wrightwood Avenue
William Warner Shingleton (1947), M.D. (Bowman Gray)	
<i>Professor of Surgery</i>	3866 Somerset Drive

Barry M. Shmavonian (1958), Ph.D. (Washington) <i>Associate Professor of Medical Psychology in Department of Psychiatry and Lecturer in Psychology</i>	2744 Sevier Street
Joseph Robert Shoenfield (1952), Ph.D. (Michigan) <i>Professor of Mathematics</i>	1700 Hillcrest Drive
R. Baird Shuman (1962), Ph.D. (Pennsylvania) <i>Associate Professor of Education</i>	3609 Duke Homestead Road
James B. Sidbury, Jr. (1961), M.D. (Columbia) <i>Professor of Pediatrics</i>	4044 Nottaway Drive
Herbert O. Sieker (1955), M.D. (Washington) <i>Professor of Medicine</i>	204 Forestwood Drive
Harold R. Silberman (1962), M.D. (Washington) <i>Assistant Professor of Medicine</i>	2718 Princeton Drive
Donald Silver (1964), M.D. (Duke) <i>Assistant Professor of Surgery</i>	2419 Alpine Road
George Addison Silver, III (1946), M.D. (Duke) <i>Associate Professor of Psychiatry</i>	3910 Dover Road
Ronald Simono (1965), Ph.D. (Wisconsin) <i>Assistant Professor of Education</i>	844 Louise Circle
William Hays Simpson (1930), Ph.D. (Duke) <i>Associate Professor of Political Science</i>	1406 Dollar Avenue
David L. Singer (1965), Ph.D. (Yale) <i>Assistant Professor of Psychology</i>	2708 Legion Avenue
Leroy C. Skinner (1959), M.A. (Maryland) <i>Assistant Professor of Physical Education</i>	2018 Sunset Avenue
Albert G. Smith (1951), M.D. (Washington) <i>Associate Professor of Pathology</i>	3831 Somerset Drive
D. Moody Smith (1965), Ph.D. (Yale) <i>Associate Professor of New Testament Interpretation</i>	Apartment 53, 1911-C House Avenue
David Alexander Smith (1962), Ph.D. (Yale) <i>Assistant Professor of Mathematics</i>	2032 West Club Boulevard
David Tillerson Smith (1930), M.D. (Johns Hopkins) <i>James B. Duke Professor of Bacteriology and Associate Professor of Medicine</i>	3437 Dover Road
Donald S. Smith, II (1961), M.H.A. (Minnesota) <i>Assistant Professor of Hospital Administration</i>	Atlas & Elba Streets Apartment 1
Grover C. Smith (1952), Ph.D. (Columbia) <i>Associate Professor of English</i>	Box 4052, Duke Station
Harmon L. Smith (1959), B.D., Ph.D. (Duke) <i>Associate Professor of Christian Ethics</i>	601 East Markham Avenue
Jesse Graham Smith (1960), M.D. (Duke) <i>Professor of Dermatology</i>	1118 Woodburn Road
Joel Smith (1958), Ph.D. (Northwestern) <i>Associate Professor of Sociology</i>	2712 Sevier Street
Peter Smith (1959), Ph.D. (Cantab.) <i>Associate Professor of Chemistry</i>	2711 Circle Drive
Robert Sidney Smith (1932), Ph.D. (Duke) <i>James B. Duke Professor of Economics</i>	2236 Cranford Road
Wirt W. Smith (1957), M.D. (Texas) <i>Associate Professor of Experimental Surgery</i>	3301 Surrey Road
Ralph E. Snider (1960), D.D.S. (Ohio State) <i>Associate in Dentistry</i>	2417 Bruton Road

- George G. Somjen (1963), M.D. (New Zealand)
*Assistant Professor of Physiology and Lecturer
in the Department of Psychology* 606 Buchanan Boulevard
- Joachim R. Sommer (1957), M.D. (Munich)
Associate Professor of Pathology 2724 Sevier Street
- Madison S. Spach (1958), M.D. (Duke)
Associate Professor of Pediatrics 2632 McDowell Street
- Dorothy Spangler (1954), M.A. (North Carolina)
Assistant Professor of Physical Education 2729 Brown Avenue
- Robert L. Spaulding (1965), Ph.D. (Stanford)
Associate Professor of Education 2744 McDowell Street
- Marshall Spector (1963), Ph.D. (Johns Hopkins)
Assistant Professor of Philosophy 4 Holmes Circle
- Joseph John Spengler (1934), Ph.D. (Ohio State), D.Hu.L.
James B. Duke Professor of Economics 2240 Cranford Road
- Alexander Spock (1962), M.D. (Maryland)
Assistant Professor of Pediatrics 2414 West Club Boulevard
- George H. Spooner (1965), Ph.D. (North Carolina)
Assistant Professor of Pathology 318 Severin Street
Chapel Hill, N. C.
- Wilford Wayne Spradlin (1962), M.D. (Virginia)
Assistant Professor of Psychiatry Route 2, Hillsborough, N. C.
- David R. Squire (1962), Ph.D. (Rice)
Visiting Assistant Professor of Chemistry 3509 Westover Road
- Olaf Stackelberg (1963), Ph.D. (Minnesota)
Assistant Professor of Mathematics 1320 Clarendon Street
- William J. Stambaugh (1961), Ph.D. (Yale)
Associate Professor of Forest Pathology 3211 Sherbon Drive
- Denis Keith Stanley, Jr. (1961), Ph.D. (Johns Hopkins)
Assistant Professor of Greek L-2A University Apartments
- Vivian T. Stannett (1961), Ph.D. (Brookline Polytechnic Institute)
Adjunct Professor of Chemistry 34 Lake Shore Drive, Chapel Hill, N. C.
- John Raphael Staude (1964), Ph.D. (California)
Instructor in History 405 Watts Street
- Eugene Anson Stead, Jr. (1947), M.D. (Emory)
Florence McAlister Professor of Medicine 2122 Campus Drive
- Donald John Stedman (1963), Ph.D. (George Peabody)
*Assistant Professor of Medical Psychology in
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- Unnstein Stefanson (1965), Ph.D. (Copenhagen)
Adjunct Professor of Zoology Beaufort, N. C.
- Robert S. Stempf, Jr. (1958), M.D. (Vanderbilt)
*Associate Professor of Pediatrics and
Assistant Professor of Physiology* Box 55, Garrett Road
- Charles Ronald Stephen (1950), M.D. (McGill)
Professor of Anesthesiology 1608 University Drive
- Lionel Stevenson (1955), Ph.D. (California) F.R.S.L.
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- Mrs. Marcia Black Stewart (1964), M.S.N. (Duke)
Instructor in Nursing 875 Louise Circle
- Defold L. Stickel (1962), M.D. (Duke)
Assistant Professor of Surgery 125 Newell Street
- Joseph W. Stiefel (1965), M.D. (Tennessee)
Associate in Neurology in the Department of Medicine 1209 Oakland Avenue
- William Frank Stinespring (1936), Ph.D. (Yale)
Professor of Old Testament and Semitics 1107 Watts Street

- Donald E. Stone (1963), Ph.D. (California)
Assistant Professor of Botany 1301 Rosemary Avenue
- Virginia Stone (1966), Ph.D. (North Carolina)
Professor of Nursing
- Jeanette Straub (1966), M.A. (Duke)
Instructor in Nursing 808 Green Street
- Howard A. Strobel (1948), Ph.D. (Brown)
Professor of Chemistry 1119 Woodburn Road
- John Strugnell (1960), M.A. (Oxon.)
Assistant Professor of Old Testament 1022 Gloria Avenue
- W. A. Stumpf (1948), Ph.D. (Chicago)
Professor of Education 127 Pinecrest Road
- James D. Stutz (1963), B.S. (Pennsylvania), Lieutenant, U.S.N.
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- Charles Woodrow Styron (1946), M.D. (Duke)
Adjunct Associate in Medicine 615 St. Mary's Street
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- Henry L. Sublett, Jr. (1962), Ed.D. (Virginia)
Associate Professor of Education 1024 Southwood Drive
- Herbert P. Sullivan (1960), Ph.D. (Durham)
Associate Professor of Religion and
Lecturer in Old Testament 206 Faculty Apartments
- John D. Sullivan (1958), Ph.D. (Michigan State)
Assistant Professor in Wood Technology 2710 McDowell Street
- Elizabeth Read Sunderland (1939-42; 1943), Ph.D. (Radcliffe)
Associate Professor of Art 6416 College Station
- Robert Oscar Swan (1961), A.M.L.S. (Pennsylvania)
Lecturer in Department of Russian 803 Buchanan Boulevard
- Louis Earl Swanson (1949), A.B. (Hamline)
Associate Professor of Hospital Administration 2418 Wrightwood Avenue
- Charles Tanford (1960), Ph.D. (Princeton)
Professor of Physical Biochemistry 1101 Norwood Avenue
- Dorothy Ellen Tate (1962), M.S. (Pennsylvania State)
Associate Professor of Dietetics 423 Whitehead Court
 Chapel Hill, N. C.
- Robert S. Tate, Jr. (1965), M.A. (Indiana)
Instructor in Romance Languages 1611 Ward Street
- W. E. Cowell Taylor (1962), M.D. (Glasgow)
Assistant Professor of Surgery V. A. Staff Quarters
- Robert ter Horst (1964), Ph.D. (Johns Hopkins)
Assistant Professor of Romance Languages 603 Watts Street
- Marcel Tétel (1960), Ph.D. (Wisconsin)
Associate Professor of Romance Languages 2310 Prince Street
- Ralph Edward Thiers (1960), Ph.D. (Toronto)
Professor of Biochemistry 143 Pinecrest Road
- Walter Lee Thomas, Jr. (1932-35; 1937-42; 1945), M.D. (Virginia)
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- Edgar Tristram Thompson (1935), Ph.D. (Chicago)
Professor of Sociology 138 Pinecrest Road
- Howard K. Thompson (1962), M.D. (Columbia)
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- Larry W. Thompson (1961), Ph.D. (Florida State)
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- David Ronald Tilley (1961), Ph.D. (Johns Hopkins)
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- George T. Tindall (1961), M.D. (Johns Hopkins)
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- Edward A. Tiryakian (1965), Ph.D. (Harvard)
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- Bert R. Titus (1961)
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Librarian

84 Westover Park Apartments
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Physics-Mathematics Library

Mrs. Mary Cox, B.A.
Librarian

1913 University Drive

Undergraduate Instruction
1966



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General Information

The University

Duke, a privately supported, church-related (Methodist) university, has about 6,800 students enrolled in nine schools and colleges. The students annually represent nearly every state and twenty-five foreign countries. There are now more than 34,000 alumni in seventy nations. The University is a member of the Southern Association of Colleges and Schools, and of the Association of American Universities, which consists of forty-one outstanding institutions.

The Undergraduate Colleges

Trinity College

Trinity College is responsible for the academic and social affairs of Duke undergraduate men in the arts and sciences. Its program is built around the development of a challenging, liberal curriculum, of honors work for able students, and effective academic counseling services. Cultural-intellectual cocurricular programs and a residential program combining faculty association with self-government are also a part of Trinity. While Trinity shares the Faculty of Arts and Sciences with the Woman's

College and the Graduate School, fifteen faculty members serve as Fellows of the College.

The Woman's College

The Woman's College combines the benefits of a small residential liberal arts college with those of a major university. As members of the residential College, students govern themselves and live within an eleven-unit house system on a well-defined portion of the larger campus. The residents of each house represent all four college classes, diverse geographical origins, and varying skills and intellectual interests. Many classes and most of the College activities center on the Woman's College (East) Campus; but women students share in a wide variety of academic, cultural, and social activities on the West (Men's) Campus. A shuttle bus between campuses assures accessibility to all points.

College of Engineering

Programs in engineering are designed to provide the opportunity for students to prepare for successful practice of the profession, for continuing personal cultural development, and for satisfying and responsible citizenship. Curricula are soundly based upon mathematics and the physical sciences; yet the engineering student also selects a number of courses in the liberal arts and is a member of a community with a liberal arts tradition. As a matter of policy, the College is relatively small, with an undergraduate enrollment of about 500. Master's and doctor's work in engineering is offered in the Graduate School.

The Objectives of a Liberal Education

Woodrow Wilson described the objectives of a liberal education as "the wholly awakened man." Though the four years in college may not seem long enough to achieve this noble ideal, at the least they prepare one for the life-long awakening. A bachelor's degree is not an end, it is a beginning. Graduation, from the Latin word *gradum*, step, marks one more stride along the way.

The idea of a liberal education, like all great ideas, eludes precise definition, but in every age men have tried to express this abstraction by describing its results. They have always fallen short, because any definition is a system of limitations. For example, a nineteenth-century master at Eton told his students:

You go to a great school not so much for knowledge as for arts and habits; for the habit of attention, for the art of expression, for the art of assuming at a moment's notice a new intellectual

position, for the art of entering quickly into another person's thoughts, for the habit of submitting to censure and refutation, for the art of indicating assent or dissent in graduated terms, for the habit of regarding minute points of accuracy, for the art of working out what is possible in a given time, for taste, for discrimination, for mental courage and mental soberness.

—William Johnson Cory

This is helpful, but the questing student will surely wish for something further, something even more explicit about the abilities, attitudes, and customs essential to a liberal education.

At Duke University, as at every school dedicated to the liberal tradition, it is the faculty that must, in the final analysis, determine the specific content of the four-year curriculum offered for those who pursue a liberal education. And in constructing that curriculum, the faculty have taken into account these aims:

First, an educated man will acquire at least some experience in the three divisions of human knowledge and inquiry:

the world of nature—the physical and life sciences;
the world of man in relation to man—the social sciences;
the world of spirit and imagination—the humanities.

The objective is a man capable of thinking in the markedly different ways represented by these three divisions; for each of them he will familiarize himself with the appropriate method and idiom as well as the particular purpose and scope.

Second, an educated man will concentrate in one discipline to enjoy the returns to be derived from intensive and specialized work.

Third, an educated man will learn to read his native language with ease and accuracy; what is more, he should develop a life-long desire to read avidly and with discernment.

Fourth, an educated man will master his native language with sufficient skill to write it with vigor and precision.

Fifth, an educated man will read, write, and speak competently at least one foreign language. Apart from any utilitarian purpose it may serve, this objective leads to an understanding of a foreign culture and at the same time affords a fresh awareness of one's own tongue and society.

And finally, a liberally educated man will acquire historical, artistic, philosophical, and spiritual perspective. An exposure to the deeds and dreams of great minds in the unending struggle to reconcile power and principle, an awareness of the ways in which men have defined beauty, a knowledge of the best in ancient thought, and an appreciation of the values men have found in the Judaeo-Christian heritage must instill a contempt for the meretricious and the second-rate.

In short, a liberal education should help a man to know, to understand,



to decide, and to express: to know the facts or how to find them, to understand those facts with insight and perspective, to decide only after understanding and conscious evaluation, and to express those decisions with ease and grace. These are not the sum of a liberal education, but they go far to assist the wholly awakened man in his unceasing quest to live with dignity and sensitivity in our complex world and to participate in the values and common purposes that infuse our civilization.

Courses of Study and Requirements for Degrees

Within the framework of the four-year curricula offered in the undergraduate colleges of Duke University, the student has the major responsibility for devising and carrying through a course program appropriate to his goals and background. He will be assisted in this task by departmental Directors of Undergraduate Studies, Supervisors of Freshmen Instruction, Faculty Advisors, and by the academic Dean of his college.

Duke University offers in Trinity College and the Woman's College, courses of study which lead to the degrees of Bachelor of Arts and Bachelor of Science; and in the College of Engineering, the degree of Bachelor of Science in Engineering.

Trinity College and the Woman's College

General Program

The General Program is designed for the student whose primary interest is in one of the liberal arts subjects. The subjects in which major work is offered are art, botany, chemistry, economics, education, English, French, geology, German, Greek, history, Latin, mathematics, music, philosophy, physics, political science, psychology, religion, Russian, sociology, Spanish, and zoology.

Bachelor of Arts

The requirements for the degree of Bachelor of Arts are based on the principle that the student will derive the maximum benefit from his college work if his program includes a broad distribution of studies among representative fields of culture, concentration within a special field, and some work of his own choice.

For graduation with the degree of Bachelor of Arts, the following course work must be completed in accordance with the academic regulations as stated in this *Bulletin*.

<i>Uniform Course Requirements</i>	<i>s.h.</i>
English	6
Foreign Language	6-18
Natural Science	8
Formal Science	3
Religion	6
Social Science and History	12
Humanities	12
Physical Education	4
<i>Major and Related Work</i>	42
<i>Electives to Make a Total of</i>	124

These requirements are described in detail below.

English. 6 s.h. This requirement is met by the completion of English 1-2.

Foreign Language. The languages which meet this requirement are French, German, Greek, Latin, Russian, and Spanish. This requirement is fulfilled by one of the following: (1) a passing grade in French 64, German 92 or equivalent, Greek 106 or 108, Latin 92, Russian 64 or Spanish 64; (2) a satisfactory score on the placement test, plus a validating year (two literature courses numbered 90 or above); and (3) passing a proficiency examination. (The proficiency examination can be taken only by students who have been enrolled in language work in the University and is not available to entering Freshmen.) Students presenting for entrance four units of Latin may satisfy the language requirements by the completion of the third college year of Latin or two years of Greek.

Students enrolled during the fall of 1962 in a language course numbered 63 or above are controlled by the regulations published in the 1960-61 *Bulletin*.

Natural Science. 8 s.h. To satisfy this requirement a student must complete a laboratory course in one of the natural sciences (botany, chemistry, geology, physics, or zoology).

Formal Science. 3 s.h. One course of at least 3 semester hours selected from mathematics (except Mathematics 11), logic, and scientific methodology (Philosophy 48).

Religion. 6 s.h. This requirement may be met in one of the following ways: (1) by completing, in the freshman year, Religion 1-2; (2) by completing, in the sophomore year or later, Religion 51-52; and (3) by completing, in the sophomore year or later, Religion 55 and one other course selected from those numbered 60-99.

Social Science and History. 12 s.h. To satisfy this requirement a student must complete 12 semester hours in two departments from the following basic courses: Economics 1-2 or 51-52; History 1-2 or 51-52; Political Science 11-12 or 61-62; Psychology 91, to be followed by either Psychology 100 or 101; or Sociology 91-92 or 93-94. (Double-numbered courses separated by a hyphen do not meet this requirement unless both courses are completed.)

Humanities. 12 s.h. To satisfy this requirement a student must complete 12 semester hours from the following courses, with six hours in each of two divisions: (Double-numbered courses separated by a hyphen do not meet this requirement unless both courses are completed.)

1. Literature: English 55-56, 57-58; Greek 121, 122; Latin 111, 112; all foreign language literature courses above 100 not given in translation.
2. Philosophy 41-42, 93-94.
3. Art and Music: Art 1-2, 51-52; Music 1-2, 51-52.

Physical Education. 4 s.h. Physical education is required during each of the first two years and is normally completed by the end of the sophomore year.

Major and Related Work. 42 s.h. The major work consists of 18 to 24 semester hours in one department above the introductory courses. Introductory courses consist of two one-semester courses in all departments except the departments of Economics and Business Administration, German, Latin, Music, and Romance Languages, in which the introductory courses may consist of four one-semester courses. The choice of courses must be approved by the major department. Whenever the department defines the major as 24 hours above the introductory courses, the student, with the prior approval of the Director of Undergraduate Studies, may substitute 6 hours of advanced work normally taken by a major in a related discipline during his junior or senior year. Eighteen hours of related work must be taken in two or more other departments and is selected subject to the approval of the major department and the Dean of the appropriate college; it may not include more than one course of 6 or 8 semester hours open primarily to freshmen. With the consent of the department, however, majors in mathematics, the natural sciences, and science education may include as related work introductory courses in mathematics and the natural sciences. Although courses satisfying the uniform course requirements may also be counted toward the requirements in major and related work,

no student may satisfy two uniform course requirements with the same course.

Electives. In addition to the uniform courses required and the major and related work, other courses must be completed to make a total of at least 124 semester hours, including 4 semester hours of physical education.

Students whose courses of study permit may elect a maximum of 18 semester hours in engineering, forestry, or medical science. The courses elected in these subjects must be approved by the major department and the Dean of the appropriate college.

Bachelor of Science

For graduation with the degree of Bachelor of Science, the following course work must be completed in accordance with the academic regulations as stated in this *Bulletin*.

<i>Uniform Course Requirements</i>	<i>s.h.</i>
English	6
Foreign Language	8-24
Mathematics	6
Natural Science	8
Social Science and History	6
Religion	6
Humanities	6
Physical Education	4
<i>Major and Related Work</i>	48
<i>Electives to Make a Total of</i>	124

These requirements are described below.

English. 6 s.h. This requirement is met by the completion of English 1-2.

Foreign Language. Bachelor of Science candidates must complete the second college year, or equivalent as determined by examination, of one foreign language, and the first college year of another. The languages submitted will be determined by the major department. Students enrolled, during the fall of 1962, in a language course numbered 63 or above are controlled by the regulations published in the 1960-61 *Bulletin*.

Mathematics. 6 s.h. This requirement may be met by completion of Mathematics 21 and 22.

Natural Science. 8 s.h. This requirement can be satisfied by courses in one of the natural sciences, namely, botany, chemistry, geology, physics, and zoology. The courses must include laboratory work.

Social Sciences and History. 6 s.h. This requirement can be satisfied by one of the following 6-hour sequences; Economics 51-52; History 1-2 or 51-52; Political Science 11-12 or 61-62; Psychology 91, to be followed by either Psychology 100 or 101; Sociology 91-92 or 93-94. (Double-num-

bered courses separated by a hyphen do not meet this requirement unless both courses are completed.)

Religion. 6 s.h. This requirement may be met in one of the following ways: (1) by completing, in the freshman year, Religion 1-2; (2) by completing, in the sophomore year or later, Religion 51-52; and (3) by completing, in the sophomore year or later, Religion 55 and one other course selected from those numbered 60-99.

Humanities. 6 s.h. This requirement can be satisfied by 6 hours from the following: English 55-56, 57-58; Greek 121, 122; Latin 111, 112; all foreign languages literature courses above 100 not given in translation; Philosophy 41-42, 93-94; Art 1-2, 51-52; Music, 1-2, 51-52. (Double-numbered courses separated by a hyphen do not meet this requirement unless both courses are completed.)

Physical Education. 4 s.h. Physical education is required during each of the first two years and is normally completed by the end of the sophomore year.

Major and Related Work. 48 s.h. Major and related work consists of at least 48 semester hours in the natural sciences. This work must be selected from the departments of botany, chemistry, geology, mathematics, physics, psychology, and zoology. The major work consists of a minimum of 18 semester hours in one department above the introductory courses. The choice of courses is subject to the approval of the department. Whenever the department defines the major as 24 hours or more above the introductory courses, the student, with the prior approval of the Director of Undergraduate Studies, may substitute 6 hours of advanced work normally taken by a major in a related discipline during his junior or senior year. The related work is taken in at least two other departments and is selected subject to the approval of the major department. With the consent of the department, majors in mathematics and the natural sciences may include as related work introductory courses in mathematics, the natural sciences, and science education. A minimum of 14 semester hours of related work is required, 8 hours of which must be in laboratory science. Although courses fulfilling the uniform course requirements may also be counted toward the requirements in major and related work, no student may satisfy two uniform course requirements with the same course. For the major in science education leading to the B.S. degree, see p. 12.

Electives. In addition to the above, the student must elect a sufficient number of courses to complete the 124 semester hours necessary for graduation.

Students whose courses of study permit may elect a maximum of 18 semester hours in engineering, forestry, or medical science. The courses elected in these subjects must be approved by the major department and the Dean of the college.

Specialized Programs

A student who has chosen a particular field may wish to take more course work in a major or related discipline than is required by his major department. The following programs of study offer a guide in planning this work, especially as it applies to preparation for various professions or professional schools.

Undergraduate Programs

Accounting. A student may specialize in public or industrial accounting in his Junior and Senior years. In either case the following courses should be taken in the freshman and sophomore years:

Freshman Year

Mathematics 17 or 21. (preferably Mathematics 21), Economics 1 and 2

Sophomore Year

Economics 51-52, 57-58, 138 (If Economics 1 and 2 not taken in Freshman year.)

Public Accounting. The following sequence of courses includes more than the requirement for a major in accounting. It is, however, a suggested list of courses which meet the current requirements of the North Carolina Board of Certified Public Accountants.

Junior Year

Ec. 143—Corporation Finance
Ec. 146—Managerial Economics
Ec. 171—Accounting Theory
Ec. 172—Corporate Accounts
Ec. 181—Business Law
Ec. 182—Business Law

Senior Year

Ec. 273, 174—Auditing Theory and Practice
Ec. 275, 276—Advanced Industrial Accounting and Management
Ec. 277—Income Tax Accounting
Ec. 295—Advanced Accounting Seminar

Election of one of the following: (either year)

Ec. 178—Accounting Systems
Ec. 180—Governmental Accounting
Ec. 184—Commercial Law for Accountants
Ec. 278—Advanced Problems in Income Taxation
Ec. 279—Budgeting and Control
Ec. 296—Advanced Accounting Seminar

Industrial Accounting. The following courses are suggested:

Junior Year

Ec. 143—Corporation Finance
Ec. 146—Managerial Economics

Senior Year

Ec. 273—Auditing, Theory and Practice

Ec. 171—Accounting Theory
Ec. 172—Corporate Accounts

Ec. 275, 276—Advanced Industrial
Accounting and Management
Ec. 277—Income Tax Accounting
Ec. 291—Business Policy

Biology—Interdisciplinary Programs. Modern biology meets and joins forces with many related fields. Examples of such interdisciplinary areas are: biomathematics, microbiology, molecular biology, oceanography, and psychobiology. Proper training for these and other areas may require work in two or several science disciplines to such depth that requirements for a conventional uni-departmental major program cannot be met in the allotted time. Any undergraduate who contemplates undertaking a graduate program in an interdisciplinary area involving biology should consult with the directors of undergraduate study of the fields concerned. They may, by joint consent, approve of major-related programs which differ from those concerned primarily with a single discipline. An interdisciplinary major student shall be considered a major in the department of his choice and be under the supervision of the Director of Undergraduate Studies of that department. Interdisciplinary programs must be planned early in the undergraduate career, preferably starting with the freshman year.

Business. A specialized program is offered to students planning to enter business. A student electing this program must take, in addition to the uniform course requirements, the following courses in the sequence indicated.

Freshman Year

Mathematics 17 or 21 (preferably Mathematics 21) Economics 1 and 2

Sophomore Year

Economics 51 and 52 (If Economics 1 and 2 not taken in Freshman year)

Economics 57, 58, Economics 138

Junior Year

Economics 143, Economics 146, *Economics elective

Senior Year

*Economics Elective, Economics 291

Music Education. The following course sequence is designed for prospective teachers of high school instrumental or vocal music. Although it includes more than the number of hours required for a major in music, it represents those courses recommended by the Music Department for state

*These electives must be chosen from the following courses: Economics 144, Economics 185, Economics 190, Economics 249

certification: Music 51-52, 65-66, 115-116, 121-122, 147-148, 3 additional semester hours in Music Literature, and 18 semester hours in Applied Music.

Other areas of concentration in music are described on pages 128-135 of this *Bulletin*.

Teaching. Duke University is accredited by the National Council for Accreditation of Teacher Education for the preparation of elementary and secondary school teachers. The University's programs are also approved by the North Carolina Department of Public Instruction.

The program for students who intend to teach is designed to prepare for positions either in elementary or secondary schools. All prospective teachers must take Psychology 91, preferably during the sophomore year, and Education 100 or 113 preferably during the junior year. Only students with an average of 2.0 overall and in their major or teaching fields will be admitted to student teaching. Special methods courses should be taken prior to undergraduate student teaching, which may be done *only* in the senior year.

Whatever their majors, students should consult an appropriate member of the Department of Education prior to each registration period to assure their meeting the certification requirements of the states in which they wish to teach and having places reserved for them in student teaching.

Elementary-School Teaching. Students preparing to teach in the elementary school must complete the following specific requirements in addition to Psychology 91 and Education 100 or 113: Education 101, 102, 105, 106, 107, 108, 118, and 161; Art 51-52; Economics 115 or 120; Health Education 134; History 91, 92; Mathematics 17 or 21; Music 151, 152; Physical Education 102; Political Science 61; and a biological science, 3 s.h. (Biology 1-2 will satisfy this requirement and minimum uniform requirements in natural science as well. Other courses listed above also may meet certain of the other minimum uniform requirements.) Students preparing to teach in the elementary school also must develop a nine to twenty-one semester-hour field of concentration in addition to the foregoing requirements.

Secondary-School Teaching. Students preparing to teach in a secondary school may meet certification requirements by qualifying in one teaching subject. Prospective secondary-school teachers must major in a subject other than education. Qualification for certification to teach a single science may be sought under either the A.B. or the B.S. degree. Students desiring to major in Science Education should read carefully the description of that program given below.

Science Education Major. Students who intend to teach sciences in the high school may major in Science Education. The program is designed to meet certification requirements and to provide the broad background of preparation in the sciences which is needed by science teachers. Students

planning to enter this program should consult an adviser in the Department of Education and in one of the science departments. The basic requirements are: Education 100, or 113, 118, 215, 216, and 276 or 246; Mathematics 21 and 22; Sciences (botany, chemistry, geology, physics, zoology, and mathematics courses numbered above 22), 42 s.h., of which 15 must be above introductory level and must include one year's study in laboratory courses in three of the following: botany or zoology, chemistry, physics, and geology.

The same major program may be followed for both the B.S. and B.A. degrees.

Preparation for Graduate and Professional Schools

Many graduate and professional schools require special tests for students seeking admission. Information regarding the test requirements should be obtained from the catalogue of the schools to which the student plans to apply. The University Counseling Service has available applications for required graduate and professional testing programs.

Graduate School. The student who plans to enter a graduate school of arts and sciences for advanced study should consult an adviser in the field of the proposed advanced study concerning suitable preparation. Most graduate schools have definite requirements in foreign languages for all students. Candidates for the degree of Doctor of Philosophy are required to pass reading examinations, usually in German and French. In some cases other languages may be substituted. As soon as practicable, the student should ascertain the requirements of the particular graduate school he desires to enter.

Medical and Dental Schools. Students planning to enter a medical or dental school should arrange their programs of study from the first semester so as to include those courses required by the professional schools of their choice. These courses usually include two years of English, two years of chemistry, and one year each of biology, mathematics, and physics. At Duke University the courses normally taken are English 1-2 and 55-56 or 57-58, Chemistry 1, 2, 61, 151, and 152, Biology 1 and 2, Mathematics 21-22, and Physics 41-42. Most professional schools require ninety semester hours of college credit before consideration for admission. Because individual medical and dental schools strongly recommend or, in some cases require specific courses in addition to those listed above, it is wise for the student to be fully aware of any additional requirements established by the professional school of his choice.

The minimum uniform course requirements and those of the major and its related work for either the A.B. or B.S. degree must be fulfilled for graduation. The latter requirements are described for each department under Courses of Instruction in this *Bulletin*. Each student may elect to major in the department of his choice, but should understand that even

with careful program planning starting his first semester, it may be necessary to exceed the 124 semester hours required for graduation.

Law Schools. Students who plan to prepare for law school may select their major work in any field. They have often chosen the following courses:

- Economics 51, 52, 57, 58.
- English 55, 56.
- History 1, 2 or 51, 52, 105, 106.
- Philosophy 48 and 41.
- Political Science 61-62.
- Sociology 91, 92.

Theological Schools and Religious Work. A student who plans to enter the ministry or follow some other professional Christian vocation should have a broad liberal arts background. Recommended majors are English, history, philosophy, and religion. It is desirable that the student include the following in his program:

<i>Basal Fields</i>	<i>Semesters</i>
(At least the number indicated)	
English—literature, composition and speech, related studies.	6
History—ancient, modern European, American.....	3
Philosophy—orientation in history, content and method....	3
Religion	3
Psychology	1
A foreign language—especially recommended: Greek, Latin, Hebrew, French, and German.....	4
Natural Science.....	2
Fundamentals of Speech.....	1

These suggestions are in harmony with the recommendations of the American Association of Theological Schools for undergraduate courses of study.

Professional Combination Courses

The provision whereby a senior may elect the work of the first year in a professional school of the University shall apply solely to eligible students in Trinity College or the Woman's College. The privilege of completing a combined course for the degree is conditioned upon admission to the professional school at the close of the junior year. A student thus admitted registers as a senior in college and as first-year student in the professional school.

Forestry. Preprofessional training in forestry is offered to students of Trinity College who are planning careers in professional forestry. A

student who has completed the three-year program of students in the liberal arts and sciences outlined below, and who has earned an average grade of C or higher (exclusive of physical education) may, with the approval of the Deans of Trinity College and the School of Forestry, respectively, transfer to the School of Forestry. Upon the satisfactory completion of the forestry course requirements in the Summer Session, and those required in the first year in the School of Forestry (see *Bulletin of the School of Forestry*), the student will be eligible for the degree of Bachelor of Science from Trinity College, Duke University.

The professional degree of Master of Forestry may be earned upon satisfactory completion of the work of the second year in the School of Forestry.

Students wishing information concerning admission to the School of Forestry are invited to consult with the Director of Admissions of that school.

The program of studies in preparation for admission to the School of Forestry under this combination program includes the following:

	<i>s.h.</i>
Uniform Course Requirements for the B.S. Degree. . . .	48-66
Additional Required Courses	24-26
Electives to Make a Total of	94
Summer Field Work	12

Uniform Course Requirements. These requirements are described in the section on requirements for the Bachelor of Science degree in this *Bulletin*. French, German, Russian, or Spanish may be used to fulfill the foreign language requirement. The natural science requirement is met by completion of Biology 1-2. The social science and history requirement is met by completion of Economics 51-52.

Additional Required Courses:	<i>s.h.</i>
Chemistry 1-2	8
Engineering 1-2	4
Geology 51	4
Physics 1-2	8
	24

Electives. The electives are normally chosen from botany, chemistry, economics, mathematics, and philosophy. A minimum of 94 semester hours must be obtained, exclusive of summer field work, to meet uniform course requirements, additional required courses, and electives.

Summer Field Work. This work of 11 weeks to be taken upon completion of the junior year includes:

	<i>s.h.</i>
F. 141—Dendrology	3
F. 150—Forest Surveying	3
F. 151—Forest Mensuration	4
F. 152—Timber Harvesting Techniques	1
	11

Trinity College students in this combination are encouraged to consult with the special adviser for students in Forestry Combination Program. The name of this adviser may be obtained at the School of Forestry office.

Law. A student who has completed, with an average grade of C, 96 semester hours of undergraduate work, including the uniform course requirements for the degree of Bachelor of Arts and the work of the junior year in his major and related fields, may, with the approval of the dean of the college, transfer to the Duke University School of Law and be eligible for the degree of Bachelor of Arts from Duke University upon the satisfactory completion therein of the work of the first year.

It is understood that this provision shall apply solely to eligible undergraduates who have completed three years in residence in Duke University, and that not less than the full first-year's work of the Law School will be acceptable for credit towards the bachelor degree.

No single discipline or program of study can be described as the best preparation for the study of law since there are various methods of approach to legal study.

Completion of the undergraduate work necessary to qualify for the Law Combination Program does not insure admission to the Duke University School of Law, nor impose any restriction whatever upon its freedom in selecting students for admission. Students wishing further information are invited to consult with the Dean of the School of Law.

College of Engineering

Bachelor of Science in Engineering

Beginning with the entering class in September, 1965, the College of Engineering offers a four-year program leading to the degree of Bachelor of Science in Engineering, with opportunity for majors in the professional fields of civil, electrical, or mechanical engineering, as well as for programs planned in interdisciplinary fields such as bioengineering, engineering mechanics, energy conversion, materials, systems and controls, and the like.

For graduation with a bachelor's degree in engineering, a minimum of 134 semester hours of course work must be completed and include the following:

English. 6 s.h. This requirement is met by the completion of English 1-2.

Mathematics. 15 s.h. This requirement is met by completion of Mathematics 21, 22, 63, 64, and 111.

Natural Science. 16 s.h. This requirement is met by completion of Chemistry 1 and 2 and Physics 41 and 42.

Social Sciences and History. 6 s.h. This requirement may be satisfied by one of the following 6-hour sequences; Economics 1-2, or 51-52; History 1-2, or 51-52; Political Sciences 11-12 or 61-62; Psychology 91, to be followed by either Psychology 100 or 101; Sociology 91-92, or 93-94.

Humanities. 6 s.h. This requirement may be satisfied by 6 hours from the following: English 55-56, 57-58; Greek 121, 122; Latin 111, 112; all foreign language literature courses above 100 not given in translation; Philosophy 41-42, 93-94; Art 1-2, 51-52; Music 1-2, 51-52; Religion 1-2 or 51-52, 55, courses numbered 60-99.

Electives in Social Science, History, and Humanities. 6 s.h. In addition to the above, the student must elect a minimum of 6 semester hours of courses in social sciences, history, or humanities.

Elective. 3 s.h. To be selected in consultation with adviser.

Physical Education. 4 s.h. Physical education is required during each of the first two years and is normally completed by the end of the sophomore year.

Departmental or Major Specifications. 37 s.h. In addition to the above requirements, 37 hours of courses in the third and fourth year are specified by the department in which the student is registered. A minimum of 16 hours must be engineering courses of which 6 hours must be design-oriented studies.

Reserve Officers Training Programs. A maximum of 6 hours of junior or senior level Air Science or Naval Science course work may be counted in satisfying the minimum requirements of 134 hours for a baccalaureate degree in engineering. These 6 hours may not be substituted for any of the above requirements in English, Social Sciences and History, Humanities, or Electives in Social Sciences, History, and Humanities. All other credits earned in Air Science or Naval Science are taken in addition to the minimum program.

Engineering Core Courses. 35 s.h. The normal engineering program includes 35 hours of engineering core courses and is met by completion of Engineering 1, 2, 23, 53, 63, 73, 83, 101, 113, 123, 133, 143, 163. Under special circumstances, a minimum of 10 hours of the normally required 16 hours of common-core engineering courses from the third- and fourth-year programs may be approved.



*Program of Studies for the Degree of Bachelor of
Science in Engineering*

Freshman Year

<i>First Semester</i>	<i>s.h.</i>	<i>Second Semester</i>	<i>s.h.</i>
Chem 1—Gen. Inorg. Chemistry . . .	4	Chem 2—Gen. Inorg. Chemistry . . .	4
Engrg 1—Engineering Design I . . .	2	Engrg 2—Engineering Design	
Approved elective	3	II	2
Engl 1—English Composition . . .	3	Engrg 23—Statics	3
Math 21—Introductory Calculus	3	Engl 2—English Composition . . .	3
P.E.—Physical Education	1	Math 22—Introductory Calculus	3
	<u>16</u>	P.E.—Physical Education	<u>1</u>
			<u>16</u>

Sophomore Year

<i>First Semester</i>	<i>s.h.</i>	<i>Second Semester</i>	<i>s.h.</i>
*Engrg 73—Mechanics of Deformable Bodies	3	*Engrg 53—Engineering Design III	2
*Engrg 83—Structure & Properties of Solids	3	*Engrg 63—Princ. of Electric Systems I	4
Humanities—Social Studies Elective	3	Humanities—Social Studies Elective	3
Math 63—Intermediate Calculus	3	Math 64—Intermediate Calculus	3
Phys 41—General Physics	4	Phys 42—General Physics	4
P.E.—Physical Education	1	P.E.—Physical Education	1
	<u>17</u>		<u>17</u>

Junior Year

<i>First Semester</i>	<i>s.h.</i>	<i>Second Semester</i>	<i>s.h.</i>
**Engrg 113—Princ. of Electric Systems II	3	**Engrg 123—Dynamics	3
**Engrg 143—Fluid Mechanics	2	**Engrg 133—Heat Transfer	2
Engrg 101—Thermodynamics	3	†Engrg 163—Fields	3
Humanistic-Social Studies Elective	3	Humanistic-Social Studies Elective	3
Math 111—Applied Math Analysis I	3	‡Departmental Course	6
‡Departmental Course	3		<u>17</u>
	<u>17</u>		

Senior Year

<i>First Semester</i>	<i>s.h.</i>	<i>Second Semester</i>	<i>s.h.</i>
Humanistic-Social Studies Elective	3	Humanistic-Social Studies Elective	3
‡Departmental Courses	14	‡Departmental Courses	14
	<u>17</u>		<u>17</u>

*The combination of Engrg 73 and 83 is interchangeable with the combination of Engrg 53 and 63.

** Engrg 113 and Engrg 123 are interchangeable; Engrg 143 and Engrg 133 are interchangeable.

†May be scheduled in a subsequent semester.

‡To be taken from approved programs in professional fields of civil, electrical, or mechanical engineering. Work may also be arranged in interdisciplinary fields such as aerospace, bioengineering, engineering mechanics, energy conversion, materials, systems and controls, and the like.

Special and Cooperative Programs

Reserve Officers Training Corps

Through the Naval and Air Force Reserve Officers Training programs the University is cooperating with the Department of Defense in providing well-educated officers for the regular and reserve forces of the Nation.

The Naval Reserve Officers Training Corps

There are two basic programs through which students can qualify for Naval commissions upon graduation; one, the Regular Naval Reserve Officers Training Corps program, which provides a maximum of four years in the University largely at government expense, followed by a commission in the regular Navy or Marine Corps; the other, the Contract program, which leads to a commission in the Naval Reserve or the U. S. Marine Corps Reserve.

The Regular Student. Quotas are awarded on the basis of an annual nation-wide test and selection procedure. Students selected are appointed Midshipmen, USNR, and receive four years tuition, fees, and textbooks at government expense plus retainer pay at the rate of \$600 per year. The regular midshipman may take any course leading to a baccalaureate or higher degree with certain exceptions, e.g., pre-medicine and medicine,

pre-theological and theological, music and art. His academic program must include 21 semester hours of Naval Science, 3 semester hours of General Psychology, one year of college physics and one year of college mathematics. The Naval Science requirement is reduced to 15 semester hours for students who are awarded Engineering Degrees upon graduation; Naval Engineering is waived and, in lieu of Naval History (NS 102, 3 s.h.), the Engineering student is required to take Naval History and Elementary Strategy (History 99, 3 s.h.). The Regular midshipman participates in two summer training cruises aboard ship and receives aviation and amphibious indoctrination at naval shore stations for one summer. Upon graduation he receives a commission as Ensign in the Regular Navy, or Second Lieutenant in the Regular Marine Corps, after which he serves with the Navy or Marine Corps, as required by the Secretary of the Navy in the same manner as his officer contemporaries who are graduates of the U.S. Naval Academy. The minimum period of commissioned service is four years for regular officers.

The Contract Student. The contract student is selected from those regularly enrolled in Duke University who desire to qualify for a commission in the Naval or Marine Corps Reserve while pursuing normal courses of study. Since he will be ordered to three years active duty immediately on graduation and commissioning, the Navy does not recommend that a medical, dental or theological student apply for this program. He must include in his academic program mathematics through trigonometry (if not successfully completed in secondary school), or one semester of college mathematics, 3 semester hours of General Psychology, and 21 semester hours of Naval Science. The Naval Science requirement is reduced to 15 semester hours for students who are awarded Engineering degrees upon graduation; Naval Engineering is waived and, in lieu of Naval History (NS 102, 3 s.h.) the Engineering student is required to take Naval History and Elementary Strategy (History 99, 3 s.h.) He has the status of a civilian who has entered into a mutual contract with the Navy and is not eligible for the benefits and pay received by regular midshipmen. He receives retainer pay of \$40 a month during his last two years in the NROTC. He goes aboard ship for one summer training cruise, normally between his junior and senior years. Upon graduation, he is commissioned in the Naval or Marine Corps Reserve and reports for a minimum of three years active duty. Upon completion of the minimum active service requirements he may request transfer to the regular component of the Navy or Marine Corps, retention on active duty as a reservist, or transfer to the inactive reserve.

Both Regular and Contract midshipmen are deferred from Selective Service by virtue of their commitment to serve on active duty after graduation. The Navy furnishes necessary uniforms and equipment. Uniforms are worn only on drill days or other special occasions when prescribed by the Professor of Naval Science. Regular and Contract students receive the

same instruction and wear the same uniforms. No distinction is made between the two in the NROTC Unit. Contract students may compete each year for the Regular Program, and if selected, they will be appointed to Regular status with the attendant benefits.

The Air Force Reserve Officers Training Corps

This unit functions as a regular department of instruction known as the Department of Air Force Aerospace Studies. It selects, trains, and commissions college men who desire to serve in the United States Air Force.

For enrollment in the General Military Course (freshman and sophomore years) the student must be accepted by the institution as a regularly enrolled student; must successfully complete such general survey and screening tests as may be prescribed; and must sign a loyalty certificate with the U.S. Government. Students initially entering the University who have had previous preparatory or high school military training are normally accepted in the General Military Course at the same academic level as that in which they are accepted by the University. The student may elect to attend a six weeks Field Training Course conducted at selected Air Force Bases instead of enrolling in the General Military Course. If he chooses this option he will report to the Field Training Unit during the summer between his sophomore and junior years. To be eligible for continuation, or initial enrollment, in the Professional Officer Course (junior and senior years), a person must:

1. be a citizen of the United States;
2. be selected for advanced training under Air Force procedures;
3. enlist in the United States Air Force Reserve;
4. contract, with the consent of his parent or guardian if he is a minor, to complete the program of advanced training;
5. agree in writing that he will accept a commission in the United States Air Force, and that he will serve in the Air Force for the period prescribed by the Secretary of the Air Force;
6. complete successfully:

- a. the General Military Course; or
- b. six weeks of summer Field Training; or
- c. have had prior honorable service in the Armed Forces of the United States. Students who qualify for the Professional Officer Course by successfully completing the General Military Course must attend four weeks of Field Training between their junior and senior years. Students must also agree to take orientation flights when offered; must be less than 28 years of age at the time of graduation; and must successfully complete such general survey and screening tests as may be prescribed and must be selected by the Professor of Aerospace Studies and the appropriate authority of the University.

During the second semester of their sophomore year, cadets who are participating in the General Military Course may indicate their desire to receive tuition assistance upon entry into the Professional Officer Course. Such assistance is awarded on a merit basis by a joint departmental and university selection board. Cadets who are selected for tuition assistance will receive tuition, books, laboratory fees, and travel reimbursement to and from their home residence at government expense and subsistence of \$50.00 per month.

Students in the General Military Course may be deferred from Selective Service upon satisfactory completion of one semester of Aerospace Studies. Advanced students are deferred as soon as they are formally enrolled in the Professional Officer Course.

For students who are not selected for tuition assistance all uniforms, texts, and training equipment are furnished at government expense, and are paid a total of approximately \$900.00 for the two years of the Professional Officers Course.

A thirty-five hour Flight Instruction Program using light aircraft is restricted to seniors who may, upon completion of the course, qualify for a Civilian Private Pilot's License. To participate in this program, Fourth Year Cadets must be physically and aptitudinally qualified for the Air Force Flight Instruction Program.

Upon graduation and completion of the Professional Officer Course, selected students for flying or line assignment will be offered commissions as Second Lieutenants in the Air Force Reserve. Reserve Officers who desire lifetime careers in the Regular Air Force may apply for regular appointments after serving on active duty for one year. Cadets who maintain a high academic and aptitudinal average are eligible for designation as Distinguished AFROTC Cadets and later Distinguished AFROTC Graduates. A designee, if fully qualified, may apply for a regular commission upon graduation.

Advanced Placement Program

The colleges have arranged for course placement on the basis of good performance on either the Advanced Placement Examinations of the CEEB or—to a more limited extent—on placement tests given by the colleges during Orientation Week. The College Board Advanced Placement Examinations are a vehicle to courses on the sophomore level or higher placement in botany, chemistry, English, French, German, history, Latin, mathematics, physics, Spanish, and zoology, whereas the Duke tests are used to decide such placement only in foreign languages and mathematics. A further distinction is that only the AP Examinations may lead to credit

toward graduation for the course or courses omitted. The departmental directors of undergraduate study and the University Registrar are charged with the responsibility for evaluations leading to advanced placement of freshman matriculants.

Advanced Placement Examinations are given in May by the College Entrance Examination Board. Information regarding the tests may be obtained from the Board. (For information on credits, see p. 52.)

Study Abroad

A student contemplating study abroad should be guided by the following provisions established by the Undergraduate Faculty Council and administered by the Committee on Study Abroad.

The student should

1. have a scholastic average of at least 2.5 (recommended);
2. obtain prior permission to study abroad from major adviser and academic dean;
3. receive certification from the foreign language department concerned that he can handle adequately the language of the country where he will study, provided that the language be taught at the freshman-sophomore level at Duke;
4. obtain in advance, wherever possible, approval of his program of studies from major adviser and academic dean.

If the student wishes to transfer credit to Duke

1. and is participating in a program sponsored by an American group, the group must have been approved by the above committee and the program he proposes must meet the qualifications of the sponsoring group
2. or studies abroad under his own sponsorship, work to be considered for transfer must be done in the language in which courses are normally given in the institutions attended.

Summer Study Abroad

Duke University, in cooperation with the Experiment in International Living, runs a summer program of study abroad in France, Germany, and Spain, open to all qualified Duke students. The program offers the opportunity to earn six to eight hours of academic credit. Participants are selected by the Committee on Study Abroad and the Experiment in International Living. Applications must be submitted before February 15 to qualify for the following summer group.



Reciprocal Agreement with the Consolidated University of North Carolina

Under a plan of cooperation between the Consolidated University of North Carolina and Duke University, students regularly enrolled in the Consolidated University during the regular academic year, and paying full fees to that institution, may be admitted to a maximum of two approved courses per semester at Duke University upon payment of a nominal registration fee of two dollars and of any other special fees regularly required of all students. Under the same arrangements, students at Duke University may be admitted to approved course work at the Consolidated University of North Carolina.

Resources for Study

Faculty

Numbering over 900, the faculty is large enough to maintain a tradition of personal attention to students, the ratio being one teacher for every seven students. Many members of the faculty are or have been national leaders in their various professional organizations, as well as consultants to industry, government, or foundations, and their contributions to scholarship include innumerable publications in all areas of research. To honor outstanding faculty members, the University has established twenty-five James B. Duke professorships, and there are twelve other named professorships as well.

University Libraries

To support a rich educational experience in a world of rapid and far-reaching change, great library collections are essential. Undergraduate students at Duke are fortunate to have available exceptional resources. The University library, among the first nineteen university libraries in the country, contains 1,750,000 volumes and 4,000,000 manuscripts. About 70,000 volumes are added annually. Separate departmental and professional school libraries provide notable collections in the several disciplines.

A division of photographic services, with the most modern cameras and



other equipment for microfilming or other photographic reproduction of printed and manuscript materials, provides a battery of reading machines to serve the Library's large collection of microfilms of rare books, periodicals, and newspapers.

The Woman's College library, with its own attractive Georgian building, contains 150,000 volumes in an open stack collection, chiefly those books most frequently used in the undergraduate curricula. The College of Engineering also maintains its own library which contains some 34,000 volumes and 425 periodicals. The larger collections of the main and specialized libraries are at hand when needed.

More detailed information may be obtained in a "Student's Guide to the General Library," available on request to the Librarian of the University.

Laboratories

The laboratories in the various science departments (Botany, Chemistry, Physics, Psychology, and Zoology) are designed for both teaching and research. Instructional and research laboratories are located in the Engineering Building and are available to students of the College. Ideal locations for special work in some of the sciences are available at Duke University Marine Laboratory at Beaufort, North Carolina; at Highlands Biological Laboratory at Highlands, North Carolina; in the Duke Forest at Durham, North Carolina; and in the Sarah P. Duke Gardens on the West Campus of Duke University.

Student Life

Living Accommodations

As the undergraduate colleges of the University are resident institutions, all students are required to live in the residence halls. Any exceptions must be approved by the Dean of Men or the Dean of Women. Rooms are not rented for a shorter period than one semester. No refund of room rent will be made except for involuntary withdrawal to enter the armed services. Such refunds are made in accordance with the University's established schedule. (See Financial Information for living expenses.)

Housing

Undergraduate Men. Upon their admission to Trinity College or the College of Engineering, men students are sent detailed information by the University Housing Bureau concerning their obligations under the housing contract. Undergraduates occupy Wannamaker Hall and Craven, Crowell, Few, and Kilgo Quadrangles. The houses in Kilgo and part of Crowell are reserved for members of the freshman classes. Each of these units has a resident Head Housemaster and one or more Housemasters. A limited number of freshmen reside in other houses where they live in community with upperclass students and a Fellow, a Faculty member or an advanced graduate student who serves as their adviser.

Undergraduate Women. All residence houses of the Woman's College—Addoms, Alspaugh, Aycock, Bassett, Brown, Gilbert, Giles, Jarvis, Pegram, and Southgate—have both single and double rooms. These houses are alike in their organization. In each of them there is a resident House Counselor, who is a member of the Dean's staff, and full representation from all four classes, with the appropriate number of places reserved each year for freshmen. Young women enrolled in Engineering also live on East Campus.

Several additional housing units providing "living-learning" experience for small groups of students are located in the Faculty Apartments Building. One of them is assigned to the French Corridor where qualified upperclassmen can gain experience in speaking the language and can share their interests in French literature, culture, and customs. A native French woman serves this group as resident Faculty Associate. French is spoken exclusively in this area and at the French table in the dining halls where residents of the Corridor have their evening meals. A similar unit is assigned to the Spanish Corridor.

Food Services

The dining facilities on the West Campus include three cafeterias, with multiple-choice menus, and the Oak Room where full meals and *a la carte* items are served. The dining halls in which all resident women have their meals are located in the Woman's College Union and in Gilbert-Addoms residence hall. Because of the large number served in the dining halls, it is not possible to arrange special diets for individual students.

Services Available

Medical Care

The Student Health Program is closely related to the Teaching Hospital of the Duke University Medical Center. This arrangement provides an unusually comprehensive service, available at all times. The cost, for regularly enrolled students, is included in the general fee paid each semester and in the fees charged each student in the summer quarter.

The Service is under the direction of the University Physician with the cooperation of the Staff. It includes hospitalization in Duke Hospital, as deemed necessary by the Hospital Staff, but is limited to thirty days; medical and surgical care under the supervision of a senior physician or surgeon; drugs; X-ray work; and ward nursing. Special nursing is not covered. Students pay for board while in the hospital. Refraction of eyes and treatment of teeth and of all chronic and pre-existing conditions, such as diseased tonsils, hernias, pilonidal cysts, and other elective surgery,

chronic skin conditions, and endocrine disturbances are not included. The cost of any necessary braces and orthopedic appliances and special nursing must be borne by the students. Blood used for transfusions must be paid for or replaced.

If students have insurance providing hospitalization, surgical, or medical benefits, the benefits shall be applied to the cost of their medical care. Accidents or illnesses occurring during vacations or while off the campus are not included in this service. A special commercial policy available only to regularly enrolled Duke students furnishes complementary protection, if desired.

Advisory consultation with a psychiatrist at no expense is available to students through referral either by the Student Health Physicians or by the Deans, but office visits for psychotherapeutic interviews are not included in this service.

A woman physician is in charge and a nurse in constant attendance at the Woman's College Infirmary. Women students receive ambulant care at regular office hours, and patients in this Infirmary can be transferred to the Duke Hospital at any hour of the day or night.

Male students receive ambulant care at the Student Health Office in the Hospital during regular office hours. The emergency service and the specialist consulting services of the Hospital and Medical School are always available.

A medical questionnaire and physical examination must be forwarded for approval prior to admission. Every applicant should be revaccinated against smallpox within three years before admission to the University. It is urgently advised that an oral vaccine routine for poliomyelitis be completed by all students and that all be actively immunized to tetanus by injections of toxoid.

Simple directions for procedure in reporting the students' needs for medical care are contained in the Student Handbook supplied to each student upon entering.

University Counseling Center

The University maintains a Counseling Center which provides a centralized program of educational, vocational, and personal counseling for students. In addition, the Bureau administers special group testing programs for University schools and departments and serves as the local testing center for a wide variety of national testing programs. The Bureau also carries on programs of research in the field of measurement and counseling.

Appointments Office

Duke University maintains an active Appointments Office which has steadily been placing students in teaching, governmental, and industrial

positions. The services of this office are available without charge to undergraduate and graduate students. Those who are interested in securing employment through the Appointments Office, or those who wish to have available for their own use in securing employment a complete file containing their academic record and pertinent recommendations, should register in this office.

Student Activities

Religious Life

"Eruditio et Religio," the motto emblazoned on the seal of the University, proclaims belief in the essential union of knowledge and religion in the educational process. The Gothic Chapel stands at the center of the campus, an inspiring symbol of the place of religion in the well-balanced life. The Chapel program encourages the cultivation of the moral and spiritual life of students.

In the University Service of Worship on Sunday morning, two hundred students participate by singing in the choir; at least one hundred other students aid in special ways as ushers, collectors, and assistants in the communion services.

Opportunities are provided through the Chapel and its related activities to translate worship into effective Christian living. Denominational, interdenominational, and interfaith loyalties are emphasized. Protestant, Roman Catholic, and Jewish students are organized in their respective groups, each having a denominational chaplain or adviser.

The University Religious Council, composed of students and faculty, promotes the interdenominational religious life in its many facets. The work of the Council and of the denominational program is under the supervision of the Chaplain to the University, who is also Director of Religious Life. He, with two Associate Directors of Religious Life and six denominational chaplains, coordinates the religious program of the campus. They also offer personal guidance and spiritual counsel to all students in matters related to their faith.

The Dean of the Chapel is a key figure in student religious life. A regular preacher to the University, he preaches in the Chapel each month. He serves as an officiating minister and participates in the planning of the University's religious program.

Additional opportunities for the enrichment of the student's religious life are offered in organ and carillon recitals, choral concerts, other special services held from time to time, and in the sermons of distinguished guest preachers from many lands who are heard in the Duke Chapel. Some students, at their own discretion, participate actively in the programs of the downtown churches of their choice.

Social and Cultural Organizations

Although the campuses for men and women are geographically separated, extracurricular life is in many respects coeducational. Each campus has its own Student Government Association, its own intersocial councils, and its own local and individual groups. In many areas all of these meet for intercollegiate life. The scope of these more than one hundred separate student organizations falls into many broad interest areas, such as student government, service, professional and honorary, publications and radio, music, drama, and social.

In the area of government, in addition to the Student Government Associations, are the Pan-Hellenic and Interfraternity Councils and the Independent House Association. The Student Union, Symposium Committee, and the YMCA and YWCA groups are primarily service organizations. The professional and honorary organizations are numerous and include traditional Greek letter societies, such as Phi Beta Kappa, as well as national and local academic and leadership groups.

The musical groups include the Chapel Choir, Symphony Orchestra, Concert Band, Glee Clubs, and several smaller groups. The Duke Players present a number of plays and readings each season. The Hoof 'n' Horn Club annually produces a musical comedy which is written, cast, directed, and acted by students from the three colleges.

Other campus groups, social in nature, sponsor dances, chaperoned cabin parties, concerts, and informal discussion groups. Social functions are frequent enough to afford the relaxation needed from work required in classroom and laboratory.

Approximately half of the undergraduate students belong to fraternities and sororities. Although there are no chapter houses, the program of fraternity and sorority activity is carried on within the sections of the regular dormitories or buildings set aside for this purpose. Eighteen national social fraternities and thirteen national sororities have chapters on campus.

The Union Building, located on the West Campus, is the student center for coeducational activities. It houses, among other groups, the Student Union organization. This body is unique in its coeducational aspects, bringing the men and women together in the carrying out of its stated purpose, "to stimulate, promote, and develop the social, recreational, cultural, educational, and spiritual activities of the students of Duke University." This purpose is carried out through a broad program including lectures, concerts, recreational activities, dances, and exhibits adapted to the leisure time interests and needs of all students, who as undergraduate students are members of the Union.

In one section of the West Campus Union are housed the Alumni offices, dining facilities, University store, grill, soda fountain, post office, barber shop, bank, and ballroom. Elsewhere in the building are student organi-

zation offices, meeting rooms, an information center, music and reading, lounge, and recreational areas. Many similar service and activity areas for the Woman's College are provided on that campus.

Recreational Activities

Students may voluntarily participate in the intramural program, which includes a dozen sports and attracts a large percentage of the student body. In a typical year more than 3,000 students forming fraternity, dormitory, and organizational teams participate in seventeen tournaments and compete for more than fifty trophies.

Within the Woman's Recreation Association various clubs including Terpsichorean (modern dance), Nereidian (water ballet), and other sports groups offer opportunities for each student to take part in the various extracurricular activities most interesting to her.

Students may check out various sports equipment and may use all facilities when they are not otherwise scheduled. These include the golf course, tennis courts, swimming pool, handball courts, gym floor, archery range, and bowling lanes.

Numerous clubs dealing with fencing, gymnastics, scuba diving, sailing, cycling, and other sports are available to interested students.

Intercollegiate Athletic Program

The program, controlled entirely by the University, consists of the organization and training of representative freshman and varsity teams in football, baseball, basketball, track, cross country, golf, lacrosse, soccer, swimming, tennis, and wrestling. In addition to these intercollegiate sports an informal fencing program is sponsored by the University.

The program is under the supervision of the Athletic Council, composed of seven members. Three of the seven are appointed by the President of the University from the faculty in the following manner: one member from the Officers of General Administration, one from the Officers of Educational Administration, Division of the Colleges, and one from the Officers of Instruction of the undergraduate colleges. From this group the President of the University appoints the faculty chairman, who serves as chairman of the Athletic Council and of its executive committee.

Four of the seven members are selected from the alumni. One of the four, a University Trustee, an alumnus, and a member of the Board's standing Committee on Physical Education and Athletics, is appointed not less frequently than every three years by the chairman of the Board of Trustees. The remaining three, who may not succeed themselves, are elected annually by the general Alumni Association for terms of three

years. The Director of Alumni Affairs serves *ex officio* as secretary of the Council and of the executive committee.

The three faculty members of the Athletic Council constitute a committee which has the responsibility of enforcing the scholarship and athletic requirements of the University for participation in intercollegiate sports. The athletic eligibility rules are those of the Atlantic Coast Conference.

The executive committee of the Athletic Council is composed of the faculty chairman of the Council, one other faculty member of the Council and one alumni member of the Council. The executive committee of the Council recommends to the President of the University persons to serve as Director of Athletics and as coaches in the various sports. The election of such persons, however, rests solely with the Board of Trustees of the University or with its Executive Committee on recommendation of the President of the University. The Director of Athletics recommends to the Athletic Council athletic schedules and the award of insignia of merit earned by members of the athletic teams. These decisions are the responsibility of the Athletic Council subject to approval of the President.

Each of the four undergraduate classes selects annually, for a term of one year, a member of each respective class to serve in an advisory capacity to the Athletic Council on the matter of awarding insignia of merit.

All funds from athletic events are handled entirely by the Treasurer of the University. An audit of the receipts and disbursements of these funds is made annually by the official auditors of the University and a report thereof made annually to the Executive Committee of the Board of Trustees.

Publications

The Duke Chronicle, the campus newspaper, is published twice a week, and the student radio station, WDBS, operates daily. Three magazines and a comprehensive yearbook are published by students. Student publications are under the control of the Publications Board, composed of six members from the University staff appointed by the President; six men from the junior and senior classes, elected by the students in Trinity College and the College of Engineering; four women from the junior and senior classes, elected by the students in the Woman's College; and one from the junior and senior classes, elected by the students in the School of Nursing; and four editors and four managers of student publications, *ex officio* members without voting power. No student publication can be established at the University without the approval of the Board.

Prizes and Awards

The achievements of undergraduate students are recognized in various fields of college activity. The following prizes suggest the range of the recognition:

The Debate Council. This council authorizes the awarding of medals to members of the graduating class who have represented the University in at least two intercollegiate debates. The medals are given by the local chapter of the Tau Kappa Alpha Fraternity.

The Robert E. Lee Prize. The gift of the late Reverend A. W. Plyler, of the class of 1892, and Mrs. Plyler. The sum of \$50 is awarded annually at Commencement, preferably to that member of the senior class of Trinity College or the College of Engineering who, in character and conduct, in scholarship and athletic achievement, in manly virtues and capacity for leadership, has most nearly realized the standards of the ideal student.

Alpha Kappa Psi Medallion. Beta Eta Chapter of Alpha Kappa Psi, a professional fraternity in commerce, awards annually the Alpha Kappa Psi Scholarship Key to the male senior student pursuing a degree in the Department of Economics and Business Administration who has attained the highest scholastic average for three years of collegiate work in this University.

Medal of the North Carolina Association of Certified Public Accountants. The North Carolina Association of Certified Public Accountants annually awards a medal to the senior who, in the judgment of his instructors, is the most outstanding student in accounting in his graduating class.

Julia Dale Prize in Mathematics. This is a prize of books given annually to the undergraduate who shows the greatest proficiency in the study of calculus.

The Milmow Prize. This prize consists of a certificate of award and a one year's payment of dues in the American Institute of Electrical and Electronic Engineers for the membership year in which the honoree is awarded his baccalaureate degree. It is awarded annually to that student from North or South Carolina graduating in the Department of Electrical Engineering who in the opinion of the faculty of that department and as shown by his grades has made the most progress in electrical engineering during his last year in college.

The George Sherrerd III Memorial Award in Electrical Engineering. This award was established in 1958 by the parents of George Sherrerd III, a graduate of the class of 1955, to recognize outstanding undergraduate scholarship. The award, consisting of the income from a fund of \$5000.00, is made annually to that senior student in Electrical Engineering who in the opinion of the Electrical Engineering faculty has attained the highest level of scholastic achievement in all subjects and simultaneously has

rendered significant service to the College of Engineering and the University at large. The recipient's name is inscribed on a plaque displayed in the Engineering Building.

The Charles Ernest Seager Memorial Award. This award, established in 1958 by the widow and friends of Charles Ernest Seager, a graduate of the class of 1955, recognizes outstanding achievement in the annual Student Prize Paper Contest of the Duke Branch of the American Institute of Electrical and Electronic Engineers. The award consists of inscribing the name of the contest winner on a plaque displayed in the Engineering Building.

The American Society of Civil Engineers Prize. This prize consists of a certificate of award and a one year's payment of dues in the American Society of Civil Engineers. Awards are made annually by the North Carolina Chapter to the two outstanding seniors in civil engineering based on the recommendation of the faculty of the Civil Engineering Department. The basis for selection is the student's scholastic record, his contribution to the student chapter, and his participation in other college activities and organizations.

The Tau Beta Pi Prize. The North Carolina Gamma chapter of Tau Beta Pi, national engineering honor society, awards each year a suitable prize such as an engineering handbook to a sophomore student in engineering for outstanding scholastic achievement during the freshman year.

The Phi Lambda Upsilon Prize. Phi Lambda Upsilon, honorary chemical society, yearly awards a suitable prize to an outstanding junior who is majoring in chemistry. The recipient's name is inscribed on a plaque displayed in the Chemistry Library.

The Pegram Chemistry Club Prize. This prize is awarded in the spring of each year for scholarship in chemistry, physics, and mathematics. The prize consists of a one-year junior membership in the American Chemical Society and a one-year subscription to either the *Journal of the American Chemical Society* or *Industrial and Engineering Chemistry*. To qualify for this prize, the student must (1) be enrolled as an undergraduate of Duke University and (2) be taking or have taken a fourth-year chemistry course. The winner of this prize is selected by a committee consisting of at least one faculty member and at least two members of the Pegram Chemistry Club; the selection is based on the quality-point average for all courses taken in chemistry, physics, and mathematics. In case of a tie equal awards are given.

The James B. Rast Memorial Award in Comparative Anatomy. This award is given annually by the parents of James Brailsford Rast in memory of their son, a member of the class of 1958 at Duke University. The award, consisting of the *Atlas of Descriptive Human Anatomy* by Sobotta and bearing the James B. Rast Memorial bookplate, is given to the student who demonstrates the greatest achievement in the study of comparative anatomy.

The Anne Flexner Memorial Award in Creative Writing. This award

has been established by the family and friends of Anne Flexner, who graduated from Duke in 1945. It consists of fifty dollars in cash and a number of books chosen by the student. The award is given annually for the best piece of creative writing submitted by a Duke undergraduate. The competition is limited to short stories (5,000 word limit), one-act plays (5,000 word limit), poems (100 line limit), and informal essays (3,000 word limit). Only one manuscript may be submitted by a candidate, and it must be delivered to the English Office, Room 325 Allen Building, before April 15.

The William Senhauser Prize. This prize is given by the mother of William Senhauser in memory of her son, a member of the Class of 1942, who lost his life in the Pacific Theatre of War on August 4, 1944. The award is made annually to the sophomore or junior in Trinity College or the College of Engineering who has made the greatest contribution through participation and leadership in intramural sports. The winner of this prize is chosen by a committee selected by the President of the University.

The Friends of Duke University Library. This group offers three prizes in an annual contest open to all undergraduate students for the best book collections acquired during their college year. The contest is supervised by the Undergraduate Committee of the Friends of the Library, which announces each fall the terms of the award. Inquiries may be directed to the Curator of Rare Books. Collections entered in the contest are exhibited each spring in the General Library. The prizes are awarded on the basis of the student's collection, a personal interview to determine the overall planning and objectives of his collecting activity, and his familiarity with his own books and the general field of his collecting interest.

The William T. Laprade Prize in History. This prize, in honor of William T. Laprade, who was a member of the History Department at Trinity College and Duke University from 1909 to 1953, and Chairman of the Department from 1938 to 1952. This prize is awarded to that senior who is graduating with distinction and whose senior essay in history has been judged unusually meritorious.

Algernon Sydney Sullivan Award. This award is provided by the New York Southern Society. Three awards may be made each year—one to a member of the senior class of Trinity College or the College of Engineering, one to a senior in the Woman's College, and one to a member of the staff of the University or the community. "In the selection of the recipients nothing shall be considered except the possession of such characteristics of heart, mind, and conduct as evince a spirit of love for and helpfulness to other men and women."

The Donald E. Spofford Medal. This medal is presented to the most outstanding member of the Men's Student Government Association.

The Horace F. Inman Award. This award is made to the fraternity, freshman, and independent dormitory which throughout the year demonstrates the best qualities in citizenship.

Admission

New students are admitted for the academic year at the opening of school in the fall.

The size of the entering classes is approximately as follows: Trinity College, 600; Woman's College, 375; College of Engineering, 175; the School of Nursing, 90. Since five thousand candidates normally apply and enrollment is limited, the Committee on Admissions selects those students who in its judgment are best qualified to benefit from the opportunities which the colleges offer. Selection is based not only upon academic grades and test scores but also upon recommendations of school officials and other personal criteria.

Requirements

Although there are no inflexible subject matter requirements, at least fifteen acceptable units of secondary school credit must be presented. Of these at least twelve must be in college preparatory subjects: English, foreign language, history and social studies, mathematics, and physical or biological sciences. Applicants for the College of Engineering are advised to present four units of mathematics and at least one unit in physics or chemistry.

Students applying for admission are required to take the Scholastic Aptitude Test, the English Composition test, and two other achievement tests of their own choosing given by the College Entrance Examination Board. Candidates applying to the College of Engineering must include the appropriate mathematics test.

Prospective students are urged to broaden their reading outside of class during their senior year and to make the acquaintance of books and magazines that do not form part of the subject matter of their courses. At the same time, they should take every opportunity to increase their competence in writing. Those who cannot write simple, clear, grammatical English prose will be progressively at a serious disadvantage in the competition for admission and also in the general work of the freshman year. Careful attention to correctness in English in correspondence and on application blanks cannot be too seriously stressed for candidates for admission.

Regular Admission

Candidates for regular admission must apply no later than January 15, and normally do so during the fall of the senior year. For this group, decisions are mailed by April 15.

Application forms and instructions regarding procedure and necessary documents to be included will be sent upon request to the Office of Admissions, Duke University, Durham, North Carolina, 27706. A non-refundable processing fee of \$10.00 must accompany the submission of the full application form.

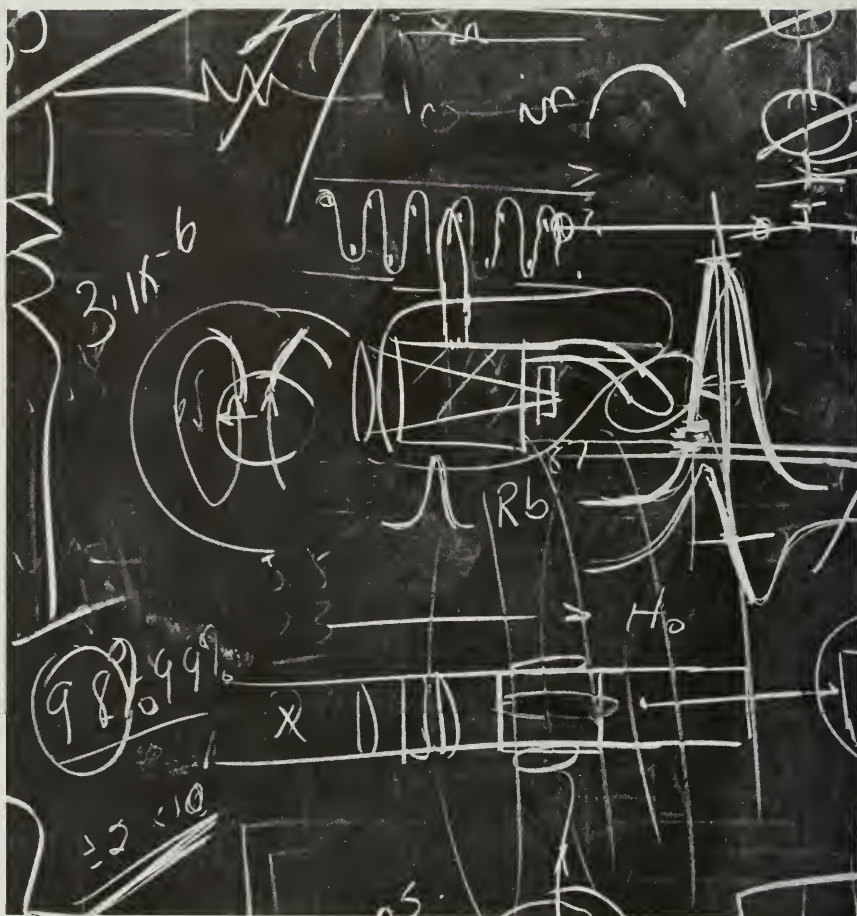
A candidate for admission who wishes to arrange an interview should do so through the Director of Undergraduate Admissions.

Early Decision Plan

For the well-qualified student who has definitely decided to enter Duke if accepted, the University offers to reserve a place by "early decision" on December 1 of the student's senior year in secondary school. The deadline date for completing applications for Early Decision is November 1. Interested students should write to the Office of Admissions for detailed information.

Admission to Advanced Standing

Admission by transfer from other institutions may be arranged for a limited number of students under certain well-defined regulations. All such candidates must submit official transcripts of all work completed at other colleges, accompanied by a statement of honorable dismissal and scores on the Scholastic Aptitude Test of the College Entrance Examination Board. An overall grade average of at least C must have been earned on work previously completed; courses on which a grade less than C has been earned cannot be accepted for transfer credit. Students may not apply for transfer beyond admission to the junior class. Further detailed regulations for admission by transfer may be obtained from the Office of Admissions.



A small number of special students of mature age may be admitted for such courses of instruction as their earlier training and experience may qualify them to take. They may not be accepted, however, as candidates for a degree in a regular course unless they are able to meet all normal requirements for admission which apply to all beginning students.

Readmission of Former Students

A student who desires to return, following withdrawal from college, should apply to the Director of Undergraduate Admissions. He will be asked to send a detailed statement of his activities since withdrawal. If practicable, the student should arrange for an interview with the appropriate Dean of his college.

Financial Information

Fees and Expenses

The prospective student who seeks the optimum opportunity in higher education will not be a bargain hunter. Certainly, some sound plan for paying the cost of college must be devised, but this plan should be formulated after the thoughtful selection of an institution has been made. No college or university can honestly say that an education at the college level is inexpensive. Most university people and the ever growing college alumni families across our nation, however, will reflect the feeling that the benefits derived from a college education constitute a handsome return on the dollars invested.

Each student going to college should analyze carefully his financial situation. In making such analysis it should be recognized that the primary responsibility for defraying the cost of an education lies with the student and his family. The typical college student can depend upon some contribution from his family's current income, a proportionate share of family savings, and anticipated income from summer employment. The number of years of study contemplated and the number of dependent children in the family should be considered in computing the funds which will be available in a particular year.

Fees paid by the students cover only a part of the cost of their instruction and of the operations of the University. Income from endowment

and contributions from the alumni, alumnae, and other public-spirited men and women meet the balance, which constitutes more than half the total cost.

Estimated Expenses for an Academic Year

Certain basic expenditures are to be considered in preparing a student's budget, such as tuition, the general fee, room and board. The necessary expenditures together with a reasonable amount allotted for miscellaneous items such as laundry, organizational dues, and sundry purchases are shown as follows:

	<i>Men</i>	<i>Women</i>
Tuition	\$1,250.00	\$1,250.00
General Fee	187.00	187.00
Room Rent	310.00	335.00
Board	*550.00	†500.00
Books and Supplies	70.00	70.00
Miscellaneous Expenses	‡443.00	‡443.00
Totals	<u>\$2,810.00</u>	<u>\$2,785.00</u>

° Cafeteria estimate. † Board rate. ‡ Moderate estimate.

Miscellaneous expenses beyond the moderate estimate given above depend to a large extent upon the tastes and habits of the individual. It is realistic to suggest that the average Duke student, however, can plan on a budget of \$2,800.00 for the academic year. Travel costs, clothing purchases, and other major expenditures would have to be added to this estimate.

Debts

No records are released and no student is considered by the faculty as a candidate for graduation until he has settled with the Bursar for all indebtedness.

Bills may be sent to parents or guardians provided the Bursar has been requested in writing to do so. Failure to pay bills on or before the due dates will debar the student from class attendance until the account is settled in full.

Tuition and Fees

Tuition and General Fee. The tuition of \$625.00 and the general fee of \$93.50 are due and payable not later than the day of registration for a particular semester. After the day of registration no refund of the tuition or the general fee will be made except for involuntary withdrawal to enter the armed services.

Registration Fees and Deposit. New students, on notification of ac-

ceptance, are required to pay a non-refundable first registration fee of \$20.00 and to make a deposit of \$50.00. The deposit will not be refunded to accepted applicants who fail to matriculate. For those who do matriculate, \$25.00 of the deposit serves as a continuing room deposit for successive semesters, and the remaining \$25.00 serves as a continuing registration deposit. Arrangements for refund of the \$25.00 room deposit are described in information furnished each resident student by the Housing Bureau.

Readmission. Students who have been readmitted to the University after an absence of one or more semesters, on notification of readmission, are required to make the \$50.00 room and registration deposit.

Late Registration. Students who register in either semester at a date later than that prescribed in the Calendar of the Colleges must pay to the Bursar a fee of \$5.00.

Refunds. The \$25.00 pre-registration deposit will be refunded to students (1) whom the University does not permit to return, (2) who graduate, or (3) who request the refund at the time of pre-registration, thus indicating their intention not to return for the following semester. The pre-registration deposit will not be refunded to students who pre-register and fail to enter the following semester on schedule.

ROTC Deposit. An Air Force ROTC deposit of \$20.00 is required of students enrolling in Air Science to cover possible loss of military equipment issued to them. This deposit is refunded to the student upon return of issued equipment.

Fees for Special Students. In the regular academic year students who register for no more than two courses with a maximum credit of eight semester hours are classified as special students. They are charged a registration fee of \$5.00 for each course and \$42.00 for each semester hour of course credit. Registration for nine or more semester hours, or three or more courses, requires payment of full fees.

Fees for Auditing. Auditing of one or more courses without charge is allowed students paying full fees, provided that the consent of the instructor is obtained. Students who are enrolled for not less than three nor more than eight semester hours may audit other courses by payment of \$21.00 for each course audited.

Fees for Duke Employees. In order to encourage its employees in their professional and personal advancement, Duke University will permit full-time employees who are paid on a monthly basis for two or more years to take one or two courses, but not more than seven semester hours and will charge \$5.00 per course plus \$21.00 per semester hour. Courses may not be audited unless at least one course is taken for credit.

Fees for Transcripts. Requests for transcripts should be directed to the Office of the Registrar. Ten days should be allowed for processing. One transcript is issued free of charge. Additional copies are supplied at \$1.00 each.

Fees for Course Changes. Changes in courses for reasons not arising within the University require a payment of \$1.00 for each change made. No course may be elected later than one week after the opening of the semester, and no student may be admitted to any class without an official enrollment.

Living Expenses

Housing. In the residence houses for undergraduate men, the rental charge for a single room is \$380.00 for the academic year or \$190.00 for each semester; for a double room the charge is \$620.00 for the academic year, or \$310.00 for each occupant, or \$155.00 per semester for each occupant. Slightly higher rates will be charged in new dormitories.

In the residential units of the Woman's College the rental charge for a single room is \$405.00 for the academic year or \$202.50 for each semester. The rental charge for a double room is \$670.00 for the academic year or \$335.00 for each occupant, or \$167.50 per semester for each occupant. Detailed information concerning the student's obligations under the housing contract is published in the Woman's College Handbook.

Food Services. The dining facilities on the West Campus include three cafeterias, with multiple-choice menus, and the Oak Room where full meals and *a la carte* items are served. The cost for the academic year ranges from \$550.00 upward depending upon the taste of the individual.

The dining halls in which all resident women have their meals are located in the Woman's College Union and in Gilbert-Addoms residence hall. The charge for board is \$250.00 per semester, payable at the time of registration. If a student withdraws during the first six weeks of the semester, a board refund is made on a *pro rata* basis; if withdrawal occurs after that time, no refund is allowed.

Student Aid

Duke University is interested in students with ability and ambition. It is the aim of the University Financial Aid Committee and others affiliated with the Financial Aid Program to provide, insofar as possible, the financial assistance required by students accepted for entrance who are unable to defray the cost of college from their own resources. The assistance is made available in the form of scholarships, grants-in-aid, loans, and part-time employment.

In 1965-66 financial aid totaled \$1,601,000.00. Of this amount \$944,650.00 was allotted to 1,058 undergraduate students in the form of scholarships, grants-in-aid, and remissions of tuition; \$256,275.00 in student loans, and approximately \$400,000.00 through part-time employment on the campus and in the city of Durham and the surrounding area.

Freshmen students shared proportionately in this aid: 351 received awards totaling \$340,226.00 in direct assistance not including loans or part-time employment. Loans were made to 142 students totaling \$76,675.00 in addition to other assistance received from Duke University.

Scholarships

All requests for applications for scholarships, grants-in-aid, industry scholarships, or remissions of tuition should be addressed to the Office of Admissions, Duke University, Durham, North Carolina.

All candidates for scholarships and grants-in-aid must submit an official Application for Admission to the University and the Application for Scholarship to the Office of Admissions. Scholarship candidates who desire to be considered for the maximum value of scholarships on the basis of financial circumstances are required to submit the "Parents' Confidential Statement" of the College Scholarship Service. The "Parents' Confidential Statement" may be obtained from high school principals or upon request from the Admissions Office.

Scholarship candidates should initiate their applications during the fall semester of their senior year of study in secondary schools. Instructions concerning the specific requirements and deadline dates will accompany the application materials sent to applicants for scholarships and grants-in-aid.

Awards annually available to undergraduate students at Duke University fall into eight major categories. These are:

Angier B. Duke Memorial Scholarships. Recipients of these awards are students whose superior records mark them as young men and young women who give outstanding promise of becoming leaders in their chosen fields of endeavor.

Number available: 31 for each freshman class.

Value: To \$2,600.00 annually.

W. N. Reynolds Memorial Scholarships. Recipients of these awards are students of outstanding ability, superior records, and show the promise of constructive leadership. In considering candidates for the awards, first consideration will be given to:

1. Children of employees of R. J. Reynolds Tobacco Company or any of its affiliates or subsidiaries.
2. Children of families residing in Forsyth County, North Carolina.
3. Other candidates who are residents or natives of North Carolina.

Duke University School of Nursing Scholarships. Recipients of these awards are young women whose superior records indicate outstanding promise of becoming leaders in the profession of Nursing.

Number available: 11 for each freshman class.

Value: \$200.00 to \$1,400.00 annually.

Huguenot Scholarship. A scholarship of \$1,000.00 per year is available from the Huguenot Society of America to a descendant of a Huguenot ancestor.

Christian Vocations Scholarships. Students preparing to enter full-time religious work are eligible to apply for special consideration on the basis of need. These students will be required to submit the "Parents' Confidential Statement." Students with need will be recommended by the Director of Financial Aid to the Christian Vocations Scholarship Committee which will consider the intention of the applicant. Students approved by the Christian Vocations Scholarship Committee are required to sign a note each semester for the amount of financial assistance granted to them by the University Scholarship Committee. These notes will be cancelled upon evidence that the student has entered full time Christian work after graduation. Pre-ministerial and religious education students ranking in the upper quarter of their graduating classes are encouraged to apply for an Angier B. Duke Memorial Scholarship.

Corporation Scholarships. Certain scholarships financed by private corporations are available annually to undergraduate students at Duke University. The selection of the recipients of these awards is made by the University Scholarship Committee. These scholarships are assigned to students whose records of scholarship and leadership are outstanding and whose financial need can be demonstrated.

Number available: 18.

Value: \$500.00 to \$2,000.00 annually.

Scholarships for Foreign Students. A limited number of awards will be made each year to qualified students from other countries who are accepted by the Office of Admissions as entering freshmen or as students with advanced standing. Candidates for these awards are required to submit the "Application for Scholarship" and the "Parents' Confidential Statement" of the College Scholarship Service provided by Admissions Office of Duke University.

Grants-in-Aid

Recipients of these awards are able students who need financial assistance in order to meet the cost of attending college.

Number available: Approximately 400 annually.

Value: From \$100.00 to \$1,500.00 annually.

Remissions of Tuition

Children of ministers in the North Carolina and Western North Carolina Conferences of the Methodist Church who are residents in the Conference and children of ministers of all faiths residing in Durham County are eligible to receive a remission of the tuition charge for a maximum of eight semesters of undergraduate study at Duke University.

Tuition Grants

Tuition grants are available to children of certain qualified staff members of Duke University for a maximum of eight semesters of undergraduate study at Duke University.

Loans

Loan funds held in trust by the University as well as funds supplied by the federal government through the National Defense Education Act of 1958 are available to qualified students. Freshmen as well as upperclassmen are eligible to apply for a student loan.

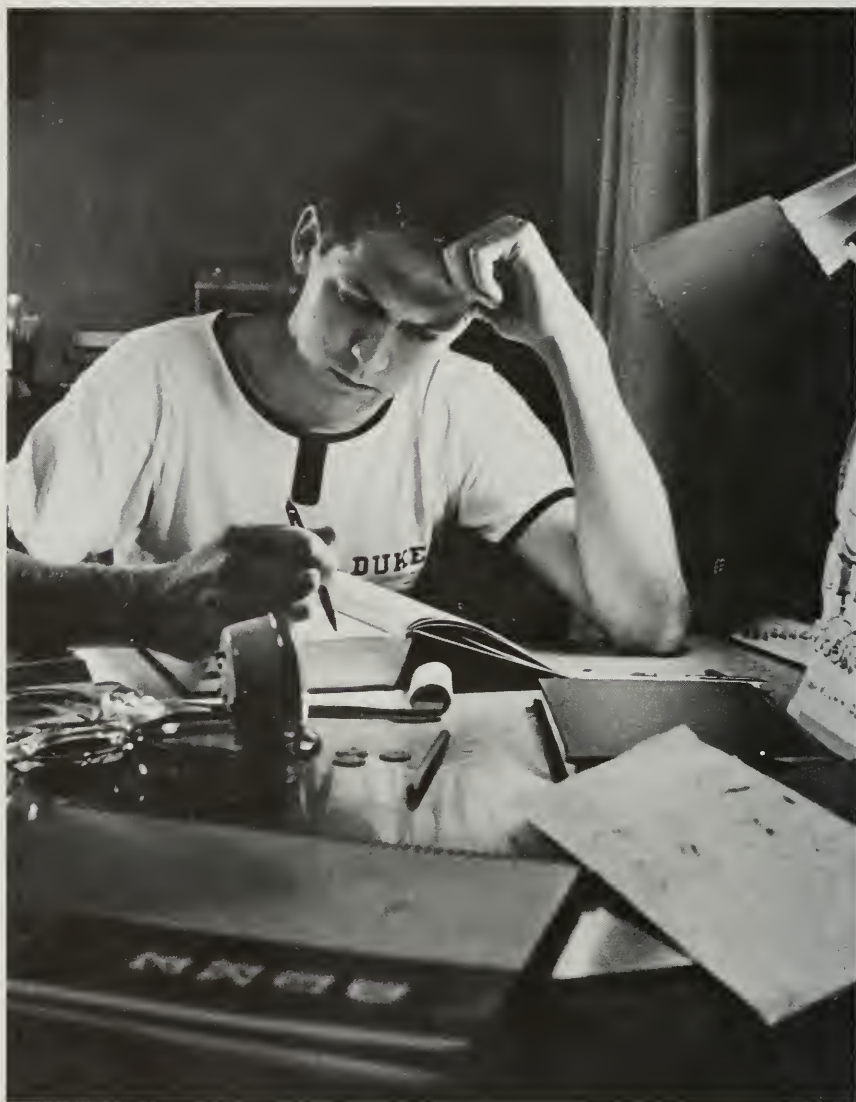
Loans generally mature after borrowers have left the University. Loan interest on long term loans from University funds accrues at the rate of one per cent from the date of each note. After a student has left the University permanently, the loans begin bearing interest at the rate of three per cent per annum. The balance unpaid after five years bears interest at the rate of six per cent per annum.

In addition to local loan funds, Duke University participates in the student loan program established under the provisions of the National Defense Education Act of 1958. Repayment of loan funds under the National Defense Education Act of 1958 normally begins nine months after the student terminates his education at the University, with complete repayment scheduled within a ten-year period. Interest accrues at the rate of three per cent commencing nine months after the borrower ceases to be a full-time student at an institution of higher education. Special benefits to those teaching in public or private nonprofit elementary and secondary schools and in institutions of higher education permit a portion of the loan to be cancelled depending upon the length of teaching service. Complete details regarding the student loan program may be obtained by writing directly to the Student Loan Office.

The Student Loan Committee in approving loan applications selects those students who from the standpoint of character, scholastic attainment, personality, and degree of financial need are deserving of this consideration. A student in residence may not, without special permission, own or operate a car during the academic year for which the loan is granted. Loan applications must be submitted not later than July 1, preceding the academic year for which assistance is requested.

Employment Opportunities

The Financial Aid Office maintains an employment office to serve students who need part-time jobs. There are many opportunities both on the campus and in the city of Durham. A considerable number of students each year help defray their college expenses by working.



Those students accepted for admission to Trinity College and the College of Engineering in need of part-time employment should apply to Financial Aid Office, Duke University, Durham, North Carolina. Students in the Woman's College should apply to the Assistant Dean of Undergraduate Women, 108 East Duke Building, Duke University, Durham, North Carolina.

University Registrations and Regulations

Registrations

Pre-registration

Each new student receives a copy of the *Academic Guide for Freshmen* and the *Bulletin* of Undergraduate Instruction in the summer and submits a trial course program for his first semester. All other students pre-register for a given semester in the fall or spring of the year on the basis of information and advising available to them. Evidence that the continuing pre-registration deposit of twenty-five dollars has been paid (See page 42 for detailed information) must be submitted at the time of spring pre-registration. A student's tentative course program is filed for permanent record in the Central Records Office after each pre-registration. He may complete his registration by mail. Students who pre-register in either semester at a date later than that specified in the calendar of the colleges are subject to a penalty of \$5.00, payable to the Treasurer. Students who do not pre-register within an allotted time must be readmitted to the college by application to the Director of Admissions.

Semester Opening and Registration

Each pre-registered undergraduate student is required to return to the University each semester on registration day and to report to his college

office by 6 p.m. Ample time should be allowed since failure to report entails loss of the continuing registration deposit and of registration in each class for which one is pre-registered. An official enrollment is required for admission to any class.

After pre-registration course changes may be made on registration day or during the first week of classes. Changes in courses for reasons not arising within the University entail a fee of \$1.00.

Academic Regulations

Course Requirements

During each semester of the regular academic year, the academic program of an undergraduate student normally consists of four or five courses totaling fourteen to seventeen semester hours (Trinity and the Woman's College), or fifteen to eighteen semester hours (College of Engineering), in either case exclusive of physical education. A maximum program of nineteen semester hours exclusive of physical education has also been fixed since the University is committed to quality work and education that is not exclusively course centered. No student is allowed to take fewer than fourteen semester hours of work without special permission from the Dean or to take more than the normal load of work unless his average grade in the preceding semester is higher than a C.

Prior to registration in the spring of his sophomore year, each student is required to choose his major field and confer with his departmental adviser about the requirements for major and related work.

Special permission of the Director of Undergraduate Studies in the student's major department and the approval of the Dean are required for a senior to elect for credit toward graduation any course open primarily to freshmen. Juniors require similar approval to take more than one such course.

Course Audit

With the consent of the instructor, a full-time, degree student is allowed to audit one or more courses in addition to the normal program. After the first week of classes in any semester, no student classified as an auditor in a particular course may take the course for credit, and no student taking a particular course for credit may change classification to an auditor. A student may not repeat for credit any course he has previously audited. Auditors submit no daily work, take no examinations, and receive no credit for courses.

Course Changes

New courses may not be elected later than one week after the opening of classes during the semester. Procedures for withdrawal from a course are determined by each of the undergraduate colleges, but in any instance permission of the Dean is required.

Attendance Regulations

The attendance regulations specifically place the responsibility for class attendance upon the individual student. *He is expected to attend classes regularly and punctually.* A student should recognize that one of the most vital aspects of a residential college experience is attendance in the classroom and that the value of this academic experience cannot be fully measured by testing procedures alone.

The members of the student body are considered sufficiently mature to appreciate the necessity of regular attendance, to accept this personal responsibility, and to demonstrate the kind of self-discipline essential for such performance and, conversely, to recognize and accept the consequences of failure to attend. An instructor is privileged to refer to the Dean of the appropriate college for suitable action students who in his opinion are causing their work or that of the class to suffer because of absences or latenesses.

Absences from tests and required classes due to illness will be excused when certified by a proper medical official. Absences due to authorized representation of the University may be excused. Officials in charge of groups representing the University are required to submit names of those persons to be excused to the appropriate Dean's office forty-eight hours in advance of the hour when their absences are to commence.

Regulations for Participation in Athletics and Other Activities

Members of athletic teams or other student groups engaging in public representation of the University are expected to be carrying their current work satisfactorily. Students may be barred from participation in such representation if, in the opinion of the Dean of their college, they fail to meet this requirement.

Grading

Final grades on performance in academic work are sent to students and parents, or guardians, after the examinations at the end of each semester. In addition six-weeks advisory grade reports for freshmen are mailed each semester. Grade symbols are:

Passing. Passing grades are A, exceptional; B, superior; C, average; and D, low pass.

Failing. A grade of F indicates that the student has failed the course and that in order to receive credit for the course he must repeat the work in class.

Absence from the final examination. In all cases in which the student is absent from a final examination, he receives an X instead of a final grade. If he does not present an acceptable explanation for his absence to the appropriate Dean's office within forty-eight hours after the scheduled time for the examination, the X is converted to an F. A student absent from examination, if the absence has been excused by the Dean, may receive an examination upon payment of a fee of \$5.00 to the Treasurer of the University. The instructor concerned arranges for examination in cases where absences are excused. An X not cleared by the end of the semester following the examination missed is converted to an F.

Incomplete work. If because of illness or other emergency a student's work in a course is incomplete, he may receive an I for the course instead of a final grade. Incomplete courses must be completed before the close of the succeeding semester; otherwise, the I is converted to an F and the course must be retaken if the student is to receive credit for it. In case a student whose work is incomplete is also absent from the final examination, he receives an X for the course.

Withdrawal. The letter W is used to indicate official withdrawal from a course. If a student drops a course without such permission, a grade of F is recorded for that course. If he drops with permission a course in which he is failing, the grade for that course is recorded as an F unless in the judgment of the Dean circumstances do not require this penalty but permit a notation of a W to indicate official withdrawal.

Credits

The unit of credit used is the semester hour, which signifies one class period a week throughout the semester. Two or three hours of laboratory work are equivalent to one hour of class work.

Seniors who at the beginning of a semester lack no more than nine hours for the fulfillment of the requirement of the requirements for the A.B. or B.S. degree may enroll, with permission of the Dean of the Graduate School, in graduate courses for a maximum total program of fifteen semester hours.

Advanced Placement Course Credit

Any student who has earned a score of three or higher on an Advanced Placement examination of the CEEB and is approved for placement in a sophomore-level course or above may be considered for course credit in appropriate subjects. For those presenting scores of four or five the award

of credit will be made automatically upon matriculation; for those presenting scores of three it will be determined with the approval of the University department concerned no earlier than at the end of the first semester. Course credit may be granted for one or two semesters in each subject area in which examination is offered in the Advanced Placement Program.

Transfer Credit

Transfer credit is evaluated from regionally accredited, degree-granting institutions. Courses taken away from Duke in which grades of less than C have been earned are not acceptable for transfer credit. Credit for work completed at other institutions will be determined in relation to the curriculum requirements of the college in which the student enrolls at Duke.

Credit for courses in science or language offered for advanced standing in any of the undergraduate colleges by a transfer student from a junior college will be evaluated by the departments concerned.

The maximum amount of credit acceptable from a junior college is sixty semester hours, exclusive of physical education. No credit is given for work completed by correspondence, and credit for no more than six semester hours is allowed for extension courses

Residence Requirements

The final four semesters—or equivalent—of work must be earned in residence except in those instances in which a student has been approved to take his junior year abroad. For engineering students, thirty of these sixty semester hours must be from those normally taken in the senior year. Students who meet this requirement but who still lack six to eight semester hours in final fulfillment of requirements may take this work in another institution of approved standing, provided the course is approved by the Chairman of their major department and by the Dean.

Quality Points and Class Standing

An overall indication of the quality of student performance is provided by assigning quality points per semester hours of a course as follows: for an A, 4; for a B, 3; for a C, 2; for a D, 1; and for an F, 0. On the basis of these points two averages are maintained for students, one a Duke cumulative average (determined by dividing the number of quality points earned at Duke by the total number of hours carried at Duke—not semester hours passed), the other a total cumulative average. The latter also includes credit assigned to work transferred from other institutions or that given in recognition of successful advanced placement (see above). In order to carry forward such credit, two quality points are assigned per semester hour though no grade is entered on a student's permanent

record. All honors at Duke are determined on the basis of the Duke cumulative average; however, the total cumulative average is the basis for determining whether continuation and graduation requirements have been met.

Trinity College and the Woman's College

In Trinity College or the Woman's College a student must achieve at least the following q.p.r.'s for continuation from

The first to the second year	18 s.h. credit and a q.p.r. of 1.30
The second to the third year	42 s.h. credit and a q.p.r. of 1.60
The third to the fourth year	66 s.h. credit and a q.p.r. of 1.70
The fourth to the fifth year (if needed)	90 s.h. credit and a q.p.r. of 1.80

These are minimum requirements for continuation in college, but do not guarantee that the student will be permitted to remain.

Freshmen must also pass at least six semester hours of work in their first semester, nine semester hours in the second semester, and eighteen semester hours in their first year; all other students must pass at least nine semester hours each semester. Physical education credits are excluded in each case.

To rank as *sophomores*, students must have to their credit at least 26 semester hours and 52 quality points; as *juniors*, at least 56 semester hours and 112 quality points; and as *seniors*, at least 90 semester hours and a quality point ratio of 1.80.

Requirements for Graduation. For graduation from Trinity College and the Woman's College in addition to completion of an approved curriculum a student must meet at least the following minimum requirements: the completion of 124 semester hours with 248 quality points and a q.p.r. of 1.90. The work of the senior year must also average at least a C (2.00).

College of Engineering

A student in the College of Engineering matriculating after September 1, 1965, must achieve at least the following q.p.r.'s for continuation from

The first to the second year	18 s.h. credit and a q.p.r. of 1.30
The second to the third year	46 s.h. credit and a q.p.r. of 1.60
The third to the fourth year	74 s.h. credit and a q.p.r. of 1.70
The fourth to the fifth year (if needed)	102 s.h. credit and a q.p.r. of 1.80

Freshmen must also pass at least six semester hours of work in their first semester, three required courses in the second semester, and eighteen semester hours in the first year; all other students must pass at least nine semester hours each semester. Physical education credits are excluded in each case.

To rank as *sophomores*, students must have to their credit at least 24

semester hours and must have passed certain specially designated courses of the freshman curriculum; as *juniors*, at least 60 semester hours and must have passed certain specially designated courses of the sophomore curriculum; and as *seniors*, at least 96 semester hours and must have passed certain specially designated courses of the junior curriculum.

Requirements for Graduation. For graduation from the College of Engineering in addition to completion of an approved curriculum, a student matriculating after September 1, 1965, must meet at least the following minimum requirements: the completion of 134 semester hours; an accumulative q.p.r. of 1.90; and a q.p.r. of 2.0 in all work, as well as in all Engineering work, taken after having attained senior standing.

Commencement

Degrees are awarded in June at commencement to those who have completed requirements at the end of either regular semester of the academic year. They are awarded at the end of the summer to students who complete degree requirements in a summer session.

Eligibility for Academic Honors

Dean's List. In recognition of academic achievement, students who earn an average quality point ratio of 3.0 or higher on a semester's work of not less than the minimum academic load are placed on the Dean's List.

Class Scholars. The five students in each combined undergraduate class of the University (including Trinity College, the Woman's College, and the College of Engineering) who achieve the highest quality point ratio on at least a normal course load for each academic year shall be designated Class Scholars.

Class Honors. To be eligible for Class Honors a student must earn, during the year, credit for at least the minimum academic load permitted by the college in which he is registered. Students in the freshman, sophomore, and junior classes who earn a 3.50 quality point ratio on all work for the year are eligible for Class Honors.

Graduation Honors. To be eligible for consideration for Graduation Honors a student must have completed in residence a minimum of ninety semester hours. Students who earn an average of at least a quality point ratio of 3.50 are recommended for a degree *magna cum laude*. Those who earn a quality point ratio of 3.75 are recommended for a degree *summa cum laude*.

Eligibility for Special Curricular Programs

Reading-out of Introductory Courses. The option to "read" in order to by-pass introductory or pre-requisite courses is open to students of

demonstrated academic ability to allow them to advance at their own pace to upper-level work. This opportunity ensures a richer program for the student who has few places in his curriculum for electives. Any student interested in reading during the summer to by-pass an introductory or pre-requisite course must be recommended by his dean and secure the permission of the department concerned. Reading for a course and auditing are mutually exclusive procedures. A proposed program of reading should be approved by the director of undergraduate studies in the department in which the work will be done. On passing a three-hour qualifying examination prepared by the department a student may be certified for advanced course work in the area. On completion of an advanced course, an entry will be made on his permanent record that he has passed a qualifying examination but no course credit is awarded. Interested students should request further information from their respective Dean's Offices.

Independent Study. Students who have a 3.0 quality point ratio overall and in their major may be permitted to enroll for independent study during their junior and senior years. The courses, numbered 191, 192 and 193, 194, are designed to permit students to pursue individual research and reading in a field of special interest subject to the supervision of a member of the staff. A student need not be in a Graduation with Distinction program to enroll in independent study courses. The maximum credit allowed for independent study and honors research courses is three semester hours per semester during the junior year and six semester hours per semester during the senior year. Interested students should consult the Director of Undergraduate Studies in the department in which they wish to work.

Graduation with Distinction. Programs featuring independent study and other honors opportunities are available under the title Graduation with Distinction in the majority of the academic departments. Although the details and requirements of the program vary from department to department, certain general requirements are uniform. Each department participating invites, at the end of their junior year, those students who have maintained at least a "B" average in the major field and an over-all average of "B" to enter the Graduation with Distinction Program. After participation in a senior seminar, and/or a directed course of reading, laboratory research, or other independent study, the student must embody the results of his individual research and study in a distinguished piece of writing. The paper is assessed by a departmental committee which, if it approves, recommends that the student be Graduated with Distinction in his major field. Interested students should consult the Director of Undergraduate Studies in the appropriate department.

Honors-Masters Program. This program, which is made possible partly by a grant from the Ford Foundation's Fund for the Advancement of Education, aims at the recruitment and accelerated preparation of college

and university teachers. Academically superior undergraduates are selected by the Honors-Masters Committee during the spring of their sophomore year. During the junior year, these pregraduates are enrolled in Colloquium 101, 102; normally the pregraduates will be candidates for graduation with distinction in their major departments. Emphasis is also placed on the acquisition of reading knowledge of two satisfactory foreign languages prior to the beginning of graduate work. Summer school scholarships as well as a limited number of first-year graduate scholarships are available.

Distinguished Professor Seminars. Interdisciplinary one-semester seminars of restricted enrollment offered to upperclassmen will be led by senior members of the faculty, usually holders of named chairs. Professors and topics are announced under the title *University Courses*. (See page 179.) Because of their scope, the seminars lie outside any particular major though a department may, at its discretion, accept one or more of them as related work. Each carries three semester hours credit.

Juniors and seniors with overall averages of at least 2.75 who meet prerequisites listed for particular seminars may apply for a seminar through the Dean of their College. Preference is given to juniors and to those not enrolled in a senior honors seminar. The selection of seminar groups is made by the moderators.





Nonacademic Regulations

Conduct and Discipline

The University expects of its students loyal and hearty cooperation in developing and maintaining high standards of conduct as well as of scholarship. General University regulations concerning conduct of students are made available to students when admission is offered, or upon request. The student in accepting admission indicates his willingness to subscribe to those regulations. The University reserves the right, and matriculation by the student is a concession of this right, to ask the withdrawal of any student whose conduct at any time is not satisfactory to the University, even though no specific charge may be made against the student.

General oversight of the conduct of students and the administering of discipline are under the supervision of appropriate deans. Immediate supervision is entrusted to the Dean of Men and the Dean of Women. However, through the expressed willingness of the students of the University to assume the responsibility of maintaining high standards of morality, the student body has become to a great degree self-governing. Two councils, one of men and the other of women, each composed of duly elected representatives of the student body, exercise the authority granted

the students by their respective colleges to investigate all cases of misconduct, as well as all other cases of violation of proper standards and traditions, and to make recommendations of penalties based on their finding. They exert a guiding and stimulating influence for the promotion of high ideals of conduct among students.

Motor Vehicles

Freshmen are not permitted to own or operate motor vehicles at the University. In accordance with University regulations members of the upper classes of Trinity College and the College of Engineering and seniors in the Woman's College may operate motor vehicles.

Students permitted to operate motor vehicles must register them annually at the beginning of the fall semester, or if the vehicle is acquired later, within five days after bringing it to the campus. Students must show a state vehicle registration and a state operator's license. A standard certificate of automobile liability insurance, issued by a recognized company and evidencing coverage of at least \$5,000 per person and \$10,000 per accident for personal injury and \$5,000 for property damage is also required. There is a registration fee of \$30.00 per vehicle for each academic year.

Students under 21 years of age must have the written consent of parent or guardian before operating a motor vehicle at Duke.



The Summer Session

The summer session at Duke University makes available to Duke undergraduate students and to undergraduates from other universities and colleges a notable program of instruction in many fields of knowledge, both academic and professional.

Undergraduates in Duke University who desire to accelerate their programs may complete the work for a degree in three years by attending two or more summer sessions.

Undergraduates from other colleges and universities may enjoy the special advantages of summer instruction at Duke and transfer their earned credits to their own institutions.

The Summer Session of 1966 will include two terms: Term I, June 13 to July 18; Term II, July 20 to August 24. By attending both terms it is possible for a student to earn as many as twelve semester hours of credit.

Instruction of interest to undergraduates will be offered in the summer of 1966 in the following departments and colleges: Botany; Chemistry; Economics and Business Administration; Education; Nursing; Engineering; English; Forestry; French; Geology; German; Greek; Health and Physical Education; History; Latin and Roman Studies; Mathematics; Philosophy; Physics; Political Science, Psychology; Religion; Sociology; Spanish; and Zoology.

Distinctive features of Summer Session instruction are provided by the program in marine biology offered at the Duke Marine Laboratory, Beaufort, North Carolina, and by various conferences in several of the departments.



While the basic purpose of the Summer Session is to serve the academic and the professional requirements of those who are interested in their own educational advancement, the University recognizes the need of, and provides for, a varied recreation program, both athletic and social.

Undergraduates of Duke University, both men and women, who plan to attend the Summer Session should enroll with the Dean of their own college in Duke University. Undergraduates in other universities or colleges who seek transfer credits should apply directly to the Director of the Summer Session, Duke University, Durham, North Carolina.

Courses of Instruction

Trinity College and the Woman's College

Note. Courses primarily for freshmen are numbered from 1 to 49; those primarily for sophomores are numbered from 50 to 99; those primarily for juniors and seniors from 100 to 199; those primarily for seniors and graduates from 200 to 299. The amount of credit for each course is given in semester hours following the description of the course.

The designation of (W) or (E) indicates that the course is to be given on the West Campus or on the East Campus. Odd-numbered courses are usually offered in the fall semester; even-numbered courses in the spring semester. *For courses which will be offered in 1966-67, consult the Official Schedule of Courses available to enrolled students in the Registrar's Office.*

Double numbers separated by a hyphen indicate that the course is a year-course and must normally be continued throughout the year if credit is received. A student must secure written permission from the instructor in order to receive credit for either semester of a year-course. Double numbers separated by a comma indicate that although the course is a year-course credit may be received for either semester without special permission.

Air Force Aerospace Studies

Professor Schlogl, Lt. Colonel, USAF, *Chairman*; Associate Professor Wilson, Major, USAF, *Director of Undergraduate Studies*

Eligibility Requirements. Freshmen enrolled in Trinity College and the College of Engineering are eligible to enroll in the General Military Course in the Air Force ROTC. For enrollment in the Professional Officer Course the student must have successfully completed either the General Military Course or the six weeks Field Training Course; have had honorable service in the Armed Forces of the United States; must execute a written agreement with the government to complete the Professional Officer Course; must be sworn into the Enlisted Reserve; and he must agree to accept a commission in the United States Air Force Reserve upon graduation.

Deposit Required. Each student must make a deposit of twenty dollars with the University Treasurer to insure return of all Government Property.

Course of Study. The course of study of AFROTC is composed of courses in the Department of Air Force Aerospace Studies. In addition to classroom instruction, the Air Force requires Leadership Laboratory each semester.

General Military Courses

First Year

AS 1. *Leadership Laboratory.*

AS 2. *Defense of the United States.* A study of the causes of world conflict, the problem of United States security, and the role of the armed forces as instruments of national policy. 2 s.h. (w) Staff

Second Year

AS 51. *World Military Systems.* A comparative study of free world military forces, Communist Military Systems, and trends in the development and employment of military powers. 2 s.h. (w) Staff

AS 52. *Leadership Laboratory.*

Professional Officer Courses

All students selected to continue Aerospace Studies pursue:

First Year

AS 101, 102. *Growth and Development of Aerospace Power.* A study of development of aerospace power in the United States; mission and organi-

zation of the Defense Department; Air Force concepts, doctrine and employment; astronautics and space operations; future development of aerospace power. Leadership Laboratory is required. 6 s.h. (w) *Wilson*

Second Year

AS 203. *The Problems of Flight and the Aerospace Sciences of Weather and Navigation.* For pilot and navigator cadets, elective for all others. 2 s.h. (w) *Schlögl*

AS 205, 206. *The Professional Officer.* Studies of the principles of leadership and their professional application in combat and managerial situations. Final portion of the second semester is devoted to the Military Justice system. Leadership Laboratory is required. 6 s.h. (w) *Schlögl*

Art

Professor Heckscher, *Chairman*; Associate Professor Jenkins, *Director of Undergraduate Studies*; Adjunct Professor Bier; Professors Hall, Markman, and Patrick, Associate Professors Sunderland and Mueller, Visiting Instructor Hannegan; Messrs. Stars and Pratt

Aesthetics

121. *The Principles of Art Criticism.* The development of criteria for making sound critical judgments based on analyses of painting, sculpture, architecture, and design. 3 s.h. (E) *Patrick*

221-222. *History of Aesthetics.* Theories of art and beauty in the western world from antiquity to the present. Some attention will be given the development theories of aesthetics in the Far East. 6 s.h. (E) *Patrick*

History of Art

1-2. *Introduction to Art History.* An historical survey of the development of architecture, sculpture, painting, and the minor arts as material manifestations of the culture of the western world from ancient to modern times, with some reference to primitive, Oriental, and other non-western culture; the visual arts as a record of a whole civilization. The course will provide the student with terminology and principles necessary to formation of judgment. Open only to freshmen; others, see Art 51-52. 6 s.h. (E & W) *Staff*

51-52. *Introduction to Art History.* The aims of this course are identical with those of Art 1-2; the content and method are adapted to the capacities of upperclassmen. Not open to upperclassmen who have received credit for Art 1-2. 6 s.h. (E & W) *Staff*

131. *Art and Archaeology of the Hellenic World.* After a preliminary treatment of the archaeological material from the Aegean, the geometric and orientalizing periods, the course deals with the architecture, sculpture and vase paintings of ancient Greece from archaic through Hellenistic times. 3 s.h. (w) *Markman*

132. *Roman Art and Archaeology.* The course opens with a treatment of the archaeological background for the formation of the Roman style as derived from Etruscan, Greek, and indigenous Italian sources, and then deals with the architecture, sculpture and painting from the early republic to the end of the empire in Italy, and to some extent in the provinces. 3 s.h. (w) *Markman*

133. *Mediaeval Architecture.* A survey of Christian architecture in the Near East, the Balkans, Russia, and western Europe from the beginnings of the mediaeval style in the late classical period to its disintegration in the fifteenth century. 3 s.h. (E) *Sunderland*

134. *Mediaeval Painting and Sculpture.* A study of painting, including mosaics, manuscripts, stained glass, and sculpture, in western Europe from the late classical period through the fourteenth century. 3 s.h. (E) *Sunderland*

135, 136. *Art of Northern Europe in the Fifteenth & Sixteenth Centuries.* Netherlandish painting from the van Eycks to Bruegel with references to French fifteenth century illumination and painting the first semester; German painting from Witz to Duerer, Gruenewald, and Holbein, with additional attention to graphic art and sculpture in the second semester. 6 s.h. (E) *Mueller*

137, 138. *Italian Renaissance Art.* A consideration of Italian sculpture and painting in the fifteenth and sixteenth centuries. The first semester will be devoted to the art of the fifteenth century; the second to that of the sixteenth. 6 s.h. (E) *Jenkins*

140. *Seventeenth Century Painting and Sculpture in Europe.* This course traces the evolution of the Baroque style in European painting and sculpture with some attention being given to related manifestations in the late sixteenth and early eighteenth centuries. Particular emphasis is laid on developments in Flanders, France, Holland, and Spain. 3 s.h. (E) *Jenkins*

141. *American Art.* A survey of architecture, sculpture, and painting in America from the time of the first settlers to the present day, including a consideration of the contributions of the English, Dutch, French, and Spanish to the artistic heritage of the United States. 3 s.h. (E) *Patrick*

143. *The History of Prints and Drawings.* An historical and critical study of drawings and prints from the fifteenth century to the present with reference to functions, values, and relationships to other forms such as painting, sculpture, and the book. 3 s.h. (E) *Mueller*

144. *Renaissance and Baroque Architecture.* A study of the development of Renaissance architecture in Italy from its beginnings in the

fifteenth century in the works of Brunelleschi to its flowering in the seventeenth century Baroque works of Bernini and Borromini, along with a consideration of the spread of Italian Renaissance forms to north Europe in the sixteenth century and its development into a Baroque style in the seventeenth century. 3 s.h. (E) *Sunderland*

145-146. *The Rise of Contemporary Architecture.* A study of the sources and evolution of the architecture of today, from the eighteenth-century conflict between Romantic Historicism and Industrialism to the work of Gropius, LeCorbusier, Wright, and their successors. 6 s.h. (E) *Hall*

Seniors graduating at midyear may receive credit for 145, which is otherwise prerequisite to 146.

147. *Painting and Sculpture in the Eighteenth and Nineteenth Centuries.* An investigation of the development of painting from the final stages of the Baroque in the eighteenth century to the period of the impressionist movement in the last decades of the nineteenth century. 3 s.h. (E) *Hannegan, Sunderland*

148. *Modern Painting and Sculpture.* The history of European painting and sculpture from 1863 to the present day. The course investigates the rise of the anti-academic movements of Impressionism and Post-Impressionism in the latter half of the nineteenth century; their outgrowth in Cubism, Expressionism, and Surrealism; and the various abstract styles of the twentieth century. Particular emphasis is placed on such artists as Manet, Renoir, Cezanne, van Gogh, Gauguin, Seurat, Matisse, Picasso, Braque, and Klee. 3 s.h. (E) *Patrick*

149. *Pre-Columbian Art and Archaeology.* A study of the architecture, sculpture, pottery, and other arts of the indigenous civilizations in Mexico, Central America, and the Andean region of South America before the Spanish conquest. 3 s.h. (w) *Markman*

150. *Latin American Art.* A study of the architecture, painting, and sculpture of Latin America from colonial times to the present. Particular emphasis will be placed on architecture of the colonial period in Mexico, Peru, and Brazil. The recent developments in mural painting in Mexico and architecture in both Mexico and Brazil will also be stressed. 3 s.h. (w) *Markman*

191, 192. *Independent Study.* Open to highly qualified students by permission of the department. (See page 56.)

For Seniors and Graduates

217. *Aegean Art.* A study of the problems of Aegean art as the forerunner of Greek art and in relation to the contemporary civilization of the eastern Mediterranean world. 3 s.h. (w) *Markman*

218. *Early Greek Art.* A study of the problems of the origin and development of Greek art in the Geometric period to the end of the Archaic. 3 s.h. (w) *Markman*

233. *Early Mediaeval Architecture.* The development of religious architecture from the time of Constantine to the end of the First Romanesque style in the third quarter of the eleventh century. 3 s.h. (E) *Sunderland*

234. *Romanesque Sculpture.* The development of sculpture in western Europe from the early Christian period through the culmination of Romanesque art in the west portal of Chartres Cathedral. 3 s.h. (E) *Sunderland*

239. *Architecture of Britain.* After a summary of recent archaeological activity in the British Isles, and a survey of Mediaeval building, the course deals principally with changing architectural problems and their solutions from the advent of the Renaissance onward. Attention is given to the interests of students majoring in history or literature. 3 s.h. (E) *Hall*

240. *Architecture of North America.* A study illustrating the transplantation of European architectural customs since the sixteenth century; the time lag in transit and acceptance of later European developments; the gradual assumption of confident independence in design; and the emergence of international leaders in the United States. 3 s.h. (E) *Hall*

292. *Research Problems in the Collections of the North Carolina Museum of Art.* A specialized study of selected art works in the collections of the North Carolina Museum of Art. Students will meet once every week in the museum in Raleigh. In completion of the course each student will submit a report on his particular research project. 3 s.h. (E) *Bier*

Design

Students other than art majors may receive not more than eight semester hours credit for work in studio courses. For any number of semester hours of credit in studio courses an equal number of hours must be taken in History and Criticism. The Introductory courses 1L-2L or 51L-52L are prerequisite for all courses in Design.

1L-2L. *Design Laboratory.* This course aims to develop the student's visual faculty through practice with design elements and experience with media. Freshmen intending to elect further courses in Art are advised to carry this course concurrently with Art 1-2. Open only to freshmen enrolled in Art 1-2; others, see Art 51L-52L. 2 s.h. (E) *Pratt*

51L-52L. *Design Laboratory.* The aims, content, and method of this course are similar to those of Art 1L-2L. Upperclassmen intending to elect further courses in Art are advised to carry this course concurrently with Art 51-52. Open only to upperclassmen enrolled in Art 51-52, and to those who have completed Art 1-2 or 51-52 without electing Design Laboratory. A senior in his last semester may receive credit for one semester. 2 s.h. (E) *Pratt*

53-54. *Beginning Studio.* A studio course offering experiment and practice with formal elements of composition in various media. Particular emphasis will be given to drawing; watercolor, collage, and three-dimensional media will be secondarily considered. 6 s.h. (E) *Pratt*

55, 56. *Painting.* A studio course designed to give experience in painting media with individual and group criticism, and discussion of important historic or contemporary ideas in painting as related to student work. Prerequisite: Art 53-54 or consent of the instructor. 4 s.h. (E) *Pratt*

157, 158. *Advanced Painting.* Emphasis is given to the techniques of various painting and design media. Prerequisite: 55, 56. 4 s.h. (E) *Pratt*

159, 160. *Printmaking.* This course presupposes a knowledge of design and skill in drawing. Practice in wood engraving; block printing; and in copperplate engraving, etching, aquatint, and drypoint. Reference will be made to prints in relation to the design of the book, and historic examples of the art of the print will be analyzed in the study of these techniques. Prerequisite: 53-54. 4 s.h. (E) *Mueller*

Departmental Major in Art

Prerequisite. Introduction to Art History (1-2 or 51-52); or, with the approval of the Director of Undergraduate Studies, equivalent hours in 100 level courses which form a background for the History of Art.

Major Requirements. The student will select in consultation with the departmental adviser a sequence of courses emphasizing either the History of Art or Design.

a. History of Art: 24 semester hours from 100 and 200 level courses distributed over the entire field of Art History, and a concentration of courses in at least two areas.

b. Design: 22 semester hours, of which 16 must be in Design and 6 from courses in the History of Art and Theory.

Related Work. 18 semester hours elected from courses in aesthetics, anthropology, English, German, Greek, Latin and Roman studies, history, history of music, history of religion, linguistics, philosophy, psychology, romance languages, and sociology.

The Department offers work leading to graduation with distinction. See the Section on honors in this *Bulletin*.

Biology

1-2. *Biology.* An introduction to the principles of biology, including organic systems from molecules to communities. Lectures, laboratories, and discussions. 8 s.h. (w) *Staff*

See other courses listed under Botany and Zoology.

Botany

Professor Johnson, *Chairman*; Associate Professor Wilbur, *Director of Undergraduate Studies*; Assistant Professors Stone and White, *Supervisors of Freshman Instruction*; Professors Anderson, Billings, Harrar, Hellmers, Kramer, Naylor, Oosting, and Perry; Associate Professors Culberson and Philpott; Assistant Professors Bryan and Searles

1-2. Biology. (See course listing under Biology 1-2.)

52. Plant Identification. Practice in the identification of local plants and a study of the principles underlying plant classification. Laboratory, lectures, and field trips. Prerequisite: one year of botany or zoology. 4 s.h. (w) *Wilbur*

55. Plant Anatomy. A comparative study of basic cell types, tissues and organs of vascular plants. Correlation of anatomical information with pertinent literature, and application of anatomy to problems in systematics and evolution, and the interrelationship between structure and function. Prerequisite: one year of botany or permission of instructor. 4 s.h. *White*

101. Principles of Heredity. The basic principles of heredity and their significance. Lectures, three hours; laboratory, two hours; conference, one hour. Laboratory work includes experimental breeding of the fruit fly. May be taken as a lecture course without laboratory. Prerequisite: one (high-school or college) course in biology, botany, or zoology. High-school algebra or one year of college mathematics recommended. 3 (without laboratory) or 4 s.h. (w) *Perry*

103. General Bacteriology. A study of the morphology and fundamental physiological processes of bacteria: their relationship to sanitation, public health, soil fertility, and food preservation. Prerequisite: one year of botany, chemistry or zoology, or equivalent. 4 s.h. (w) *Johnson*

105. Plant Morphology. Vegetative organization and reproductive cycles of major plant group representatives. Main theories of evolutionary origin and phylogenetic interrelationships. Prerequisite: One year of botany. 4 s.h. *Culberson*

151. Introductory Plant Physiology. The principal physiological processes of plants, including water relations, synthesis and use of foods, and growth phenomena. Prerequisite: Biology 1-2 or equivalent; one year of chemistry. 3 s.h. (w) *Kramer*

156. Plant Ecology. Principles of the relationships between plants and their environment. The structure and processes of typical ecosystems. Laboratory, lectures, and field trips. Prerequisites: Biology 1-2 and 52, or equivalent. 4 s.h. (w) *Billings*

191, 192, 193, 194. Independent Study. Directed reading and research.

Open only to highly qualified students in the junior year by permission of the Department. See page 56. 6 s.h.

202. Genetics. The principles of heredity, their cytological basis, and their bearing on other fields of biology. Laboratory work involves experimental breeding of the fruit fly and interpretation of data from the breeding of plants. Offered in alternate years. Prerequisites: one year of botany, zoology, or equivalent, and one year of college mathematics. 4 s.h. (w) *Perry*

209. Lichenology. Morphology, systematics, and biological and ecological implications of the lichens. Collection and identification of specimens and the use of lichen chemistry in taxonomy. Prerequisite: Two semesters of botany. 3 s.h. (w) *Culberson*

210. Bryology. Morphological, systematic and ecological characteristics of mosses and liverworts. 3 s.h. *Anderson*

212. Phycology. Morphological and ecological characteristics of common freshwater and marine algae and principles of their classification. Collection, identification and preparation of permanent specimens. 3 s.h. *Searles*

218. Comparative Morphology of Vascular Plants. Fundamental anatomical and morphological problems and theories in relation to vascular plant evolution; emphasis on comparative vegetative and reproductive characters indicating evolutionary trends. Basic techniques in preparing materials, analyzing results and correlating with current literature. 4 s.h. *White*

221. Mycology. Field and laboratory study of vegetative and reproductive structures of the fungi and slime molds. Methods of collection, isolation, propagation, and identification of the major orders as represented in the local flora. Prerequisite: One year of biological science. 4 s.h. (w) *Johnson*

225, 226. Special Problems. Students with adequate training may do special work in the following fields:

1. *Mycology and Plant Pathology.* *Johnson*
2. *Cytology.* *Anderson and Bryan*
3. *Ecology.* *Oosting and Billings*
4. *Genetics.* *Perry*
5. *Morphology and Anatomy of Vascular Plants.* *Philpott and White*
6. *Bryology.* *Anderson and Bryan*
7. *Physiology.* *Hellmers, Kramer and Naylor*
8. *Taxonomy of Vascular Plants.* *Stone and Wilbur*
9. *Bacteriology.* *Johnson*
10. *Lichenology.* *Culberson*
11. *Phycology.* *Searles*

240. Evolution. Analysis of the processes of adaptation and evolution in individuals, populations, and genetic systems. Prerequisites: Intro-

ductory biology and genetics, or consent of instructor. Cytology recommended. 3 s.h. (w) *Stone*

243. Cytology. The structural and functional organization of cells. Lectures, readings, and laboratory work. Prerequisite: one year of botany or zoology. (This is the same course as Zoology 243.) 4 s.h. (w) *Anderson*

252. Plant Metabolism. The physiochemical processes and conditions underlying the physiological processes of plants. Prerequisite: Botany 151 or equivalent; organic chemistry recommended. 4 s.h. (w) *Naylor*

254. Plant Water Relations. A study of factors affecting the availability of water, its absorption and use in plants, and the effects of water deficits on plant processes. Assigned readings, reports, and lectures. Prerequisite: Botany 151 or equivalent. 3 s.h. (w) *Kramer*

255. Plant Systematics. A study of the historical background of plant taxonomy, modern concepts and systems of classification, nomenclatural problems, and the taxonomy of specialized groups. Prerequisite: two years of botany, including Botany 52 or equivalent. 4 s.h. (w) *Wilbur*

256. Community Analysis and Classification. The development of concepts and methods in synecology and their present application to the study of plant communities. Prerequisite: Botany 156 or equivalent. 3 s.h. (w) *Oosting*

257. Principles of Plant Distribution. Interpretation of floristic and ecological plant geography of world vegetation. Prerequisite: Botany 156 or equivalent. 3 s.h. (w) *Billings*

258. Physiology of Growth and Development. Consideration of the internal factors and processes leading to the production of new protoplasm and its differentiation at the cellular, tissue and organ level in plants. Prerequisite: Botany 151 or equivalent; organic chemistry recommended. 4 s.h. (w) *Naylor*

259. The Environment. Environmental principles and methods of obtaining and evaluating climatological data for ecological purposes with special attention to instrumentation and microclimate. Prerequisite: Botany 156 or equivalent. 3 s.h. (w) *Billings*

Marine Laboratory. Botany 211, *Marine Algae*, and 207, *Marine Mycology*, are given alternate years at the Duke University Marine Laboratory, Beaufort, N. C.; Botany 220, *Coastal Field Botany*, is offered biennially. Consult the *Bulletin of the Marine Laboratory*.

253. Dendrology. Nomenclature, classification, and identification of woody plants with special reference to species indigenous to southeastern United States and other important forest regions of temperate North America. Laboratory and field work. Prerequisite: one year of botany. 3 s.h. (w) *Harrar*

Departmental Major

Prerequisites. Biology 1 and 2.

Major Requirements. A minimum of 24 hours (A.B. and B.S.) of work beyond Biology 1 and 2, including at least four of the following courses: Botany 52 (Systematics), 55 (Anatomy), 105 (Morphology), 101 (Principles of Heredity), 151 (Physiology) and 156 (Ecology). The remaining hours may be selected from these and any other courses in the Department for which the student is eligible, subject to approval of the Director of Undergraduate Studies.

Related Work. Courses in at least two natural science departments sufficient to total, with major work, 42 s.h. (A.B.) or 48 s.h. (B.S.)

Chemistry

Professor Bradsher, *Chairman*; Assistant Professor Bonk, *Director of Undergraduate Studies*; Professors Brown, Hill, Hobbs, Krigbaum, Saylor, Strobel, and Wilder; Associate Professors Chesnut, Poirier, Quin, and Smith; Assistant Professors Jeffs, Jones, Palmer, Toren, and Wells

1, 2. General Inorganic Chemistry. Lectures and recitations on the elementary principles of chemistry and on the structure, properties, preparation and uses of the elements and their compounds. The laboratory work includes qualitative analysis of some of the more common metals. Two lectures, one recitation, and three laboratory hours throughout the year. Chemistry 1 is a prerequisite for Chemistry 2. Prerequisite: Qualification for Math 21. 8 s.h. (E & W) *Bonk, Staff and Assistants*

41, 42. Advanced General Chemistry. More theoretical than Chemistry 1, 2; emphasizes atomic and molecular structure, chemical kinetics, elementary thermodynamics, and chemical equilibria with special attention in the second semester to the physical chemistry of aqueous solutions. In the first semester a series of modest research experiments constitute the major part of the laboratory program; in the second semester experiments illustrate the principles of chemical equilibria and the techniques of quantitative and instrumental analysis. Credit is *not* awarded for both Chemistry 2 and 42 nor for both 42 and 61. Prerequisites: Mathematics 21, which may be taken concurrently, and permission of the instructor. For Chemistry 42, Chemistry 41 is a prerequisite; however, invitations to Chemistry 42 will be extended to students who have had excellent records in Chemistry 1. 8 s.h. (W) *Strobel and Wilder*

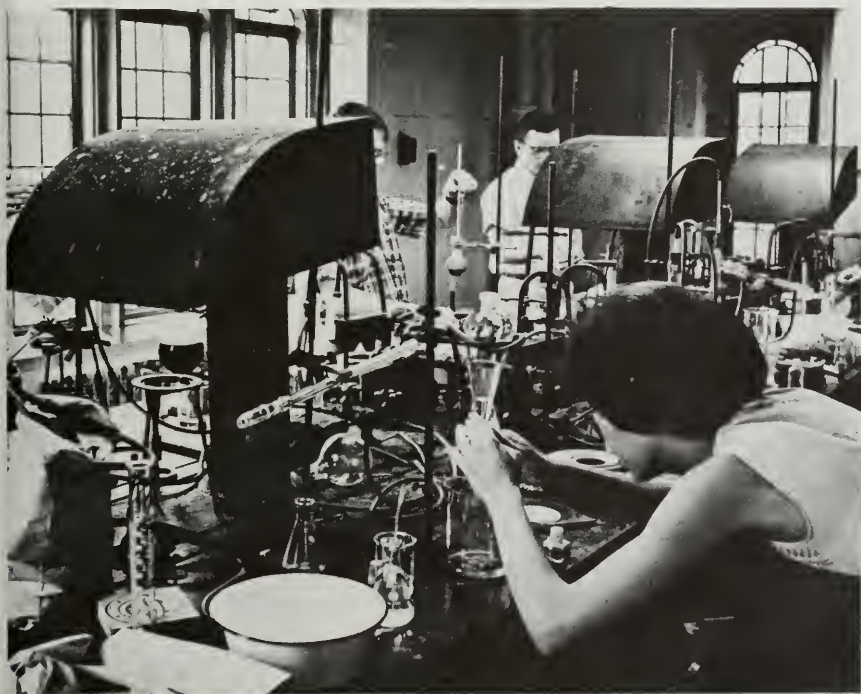
61. Physical Chemistry of Aqueous Solutions. An intensive study of chemical equilibria with special attention to the physical chemistry of aqueous solutions, ionic and molecular structure, and elementary thermodynamics. Laboratory experiments illustrate the principles of gravimetric,

volumetric, and instrumental analysis. One lecture, one recitation, and six laboratory hours. Prerequisites: Chemistry 1, 2 and Mathematics 21. 4 s.h. (w) *Wilder, Jones, Poirier, Toren and Assistants*

70. Quantitative Analysis. A study of the theory and techniques of gravimetric, volumetric, and instrumental methods of analysis. One lecture, one recitation, and six laboratory hours. Not open to B.S. Chemistry majors. Prerequisite: Chemistry 42 or 61. 4 s.h. (w) *Toren, Wells and Assistants*

132. Quantitative and Instrumental Analysis. Practice in advanced quantitative analysis and in the use of chemical instrumentation in analysis. A discussion of the theoretical and applied aspects of chemical and instrumental methods of analysis. Prerequisites: Chemistry 161, 162, the latter half of which may be taken concurrently. 4 s.h. (w) *Toren*

151, 152. Organic Chemistry. An introduction to the study of the compounds of carbon in which the chemistry of both aliphatic and aromatic compounds is considered. Laboratory experiments are selected to illustrate the more important reactions and preparations of organic compounds. Two lectures, one recitation, and three laboratory hours. Prerequisite: Chemistry 42 or 61. Chemistry 151 is prerequisite for 152. 8 s.h. (w) *Bradsher, Miss Brown, Jeffs, Quin, and Assistants*



161, 162. *Physical Chemistry.* Fundamentals of theoretical chemistry illustrated by selected laboratory experiments. Three recitations and three laboratory hours. Prerequisites: Chemistry 42 or 61, Physics 41-42, and Mathematics 63. 8 s.h. (w) *Hobbs and Smith*

191, 192. *Independent Study.* Directed reading and research. Open only to highly qualified students by permission of the department. (See page 56.)

206. *Elements of Theoretical Chemistry.* A one semester course in the principles of physical chemistry. Credit is not given for both 206 and 161-162. Three recitation and three laboratory hours. Prerequisites: Chemistry 70, Physics 41-42, and Mathematics 22. 4 s.h. (w) *Saylor and Jones*

216. *Nuclear Chemistry.* Elementary theory of nuclear reactions and properties of radioisotopes. Main emphasis on tracer techniques and interpretation of tracer studies. Two recitations and three laboratory hours. Prerequisites: Chemistry 70 or 132, 152, and Physics 41-42. 3 s.h. (w) *Hill*

234. *Chemical Instrumentation.* Discussion of the principles of instrument design, electronics, and chemical measurements with emphasis on optical methods. One lecture and three laboratory hours. Prerequisite: Chemistry 132, which may be taken concurrently, or an equivalent course. 2 s.h. (w) *Strobel*

235. *Advanced Analytical Chemistry.* A theoretical and applied treatment of chemical kinetics, electrode processes, multi-stage separations, organic reagents, and functional group chemistry as related to modern analytical techniques. Prerequisite: Chemistry 132 and 162. 3 s.h. (w) *Toren*

251. *Qualitative Organic Analysis.* Systematic identification of organic compounds based upon a study of physical and chemical properties. Infrared and ultraviolet absorption spectra are used in elucidation of structure. One lecture and six laboratory hours per week. Prerequisite: Chemistry 152. 3 s.h. (w) *Quin*

252. *Advanced Organic Preparations.* A laboratory course designed to supplement the student's knowledge of fundamental organic processes by a selected group of laboratory experiments accompanied by discussions of techniques and theories pertinent to the experiments. Five hours laboratory and lecture with lectures in alternate weeks. Prerequisite: Chemistry 152. 2 s.h. (w) *Miss Brown*

253. *Intermediate Organic Chemistry.* An advanced study of the reactions of organic compounds and the theories of organic chemistry. Prerequisite: Chemistry 152 and permission of the Director of Undergraduate Studies. 3 s.h. (w) *Quin and Wilder*

265. *Inorganic Chemistry.* An advanced study of the bonding, structures, and reactions of inorganic compounds based on modern physical

chemical concepts. Three lectures. Prerequisite: Chemistry 162 or the permission of the Director of Undergraduate Studies. 3 s.h. (w) *Wells*

271. *Introduction to Research.* Lectures on the use of chemical literature and on special areas of chemical research. Oral and written reports by the students on topics selected from current chemical literature. One lecture. 1 s.h. (w) *Miss Brown*

275-276. *Research.* A course designed to give instruction in methods used in the investigation of original problems. It is open to seniors by permission of the Director of Undergraduate Studies. 1 to 3 s.h. (w) *Staff*

Departmental Major

For the degree of A.B.

Prerequisites. Chemistry 1 and 2 (or 41), Mathematics 21, 22.

Major Requirements. 22 s.h., including Chemistry 61 (or 42), 70, 151, 152, and an additional 6 to 8 s.h., which may be satisfied by 161-162 or 206 together with 2 or 3 s.h. selected from the courses 216, 234, 251, and 252.

Related Work. 20 s.h., including Physics 41-42 with the remainder usually in botany, geology, mathematics, physics or zoology.

For the degree of B.S.

Prerequisites. Chemistry 1 and 2 (or 41), Mathematics 21, 22, 63.

Major Requirements. Chemistry 61 (or 42), 132, 151, 152, 161, 162, 251, 265, 271, and 216 or 234 or 252.

Related Work. 18 s.h., including Physics, 11 s.h. and Mathematics 64 or 131 or 221.

The language requirements must be satisfied by German 64 and either French 2 or Russian 2.

The department offers work leading to graduation with distinction. Consult the section on Honors and Prizes in this *Bulletin*.

Chinese

(Elementary Chinese [101-102] is offered by the University of North Carolina, Chapel Hill. Three semester hours of credit each semester; five hours each week: three of grammar, two of oral practice. Prerequisite: junior standing.)

Classical Studies

Professor Rogers, *Chairman, Director of Undergraduate Studies in Latin*;
Professor Truesdale, *Director of Undergraduate Studies in Greek*; Profes-



sors Marti and Willis; Assistant Professors Settle, Stanley, Strugnell, Womble and Wooley

Greek

1-2. *Elementary Greek.* A study of grammar and an introduction to reading. 6 s.h. *Willis and Wooley*

63-64. *Intermediate Greek.* Introduction to Greek prose and poetry. First semester, Plato's *Apology of Socrates* and two dialogues; second semester, Euripides' *Alcestis*. 6 s.h. *Stanley*

97, 98. *Sight Reading in Greek Prose.* Readings from easy Attic prose writers. Open to students who have completed one year of college Greek or the equivalent, with consent of the instructor. Two hours per week throughout the year. 2 s.h. *Staff*

103. *Greek Historians.* Selections from Herodotus and Thucydides. 3 s.h. *Willis or Wooley*

104. *Greek Orators.* Selections from Isocrates and Demosthenes. 3 s.h. *Willis or Wooley*

105, 106. *Homer and the Greek Lyric.* First semester, selected books of the *Iliad*; in the second, portions of the *Odyssey* and selections from lyric poets. 6 s.h. *Truesdale*

107-108. *Greek Drama.* Selected plays from Greek tragedy and comedy. 6 s.h. *Truesdale or Willis*

117-118. *Greek Prose Composition.* The character of the course is determined by the needs of the students enrolled. 2 s.h. *Truesdale*

191, 192. *Independent Study*. Directed reading and research. Open only to highly qualified students, in the junior year, by permission of the department. See page 56. 6 s.h. *Staff*

Latin

1-2. *Course for Beginners*. Forms, vocabulary, pronunciation, and syntax, with reading of easy Latin prose. The effort is made to promote rapid development of the ability to read Latin with satisfaction. 6 s.h. *Settle*

63-64. *Intermediate Latin*. Rapid, intensive review of fundamentals; readings from Cicero and other prose authors, and from Vergil's *Aeneid*, with emphasis on development of comprehensive reading ability. 6 s.h. *Settle and Wooley*

91. *Latin Prose*. Selections from prose authors or Cicero's *De Senectute* and *De Amicitia*, or selected books of Livy's history, with special emphasis on developing competence in reading Latin. 3 s.h. *Stanley and Womble*

92. *Latin Poetry*. Selections from the greatest Latin poets, especially Horace's *Odes*. 3 s.h. *Stanley and Womble*

97. *Sight Reading in Classical Latin*. One period of an hour per week devoted to practice in the reading of Latin on the classical period; designed to train students to read with facility. 1 s.h. *Willis*

98. *Sight Reading in Mediaeval Latin*. One period of an hour per week devoted to reading interesting mediaeval prose and poetry. Prerequisite: at least one of the following courses: Latin 63, 64, 91, 92, and 97, or an equivalent. 1 s.h. *Willis*

101. *Tacitus*. Interesting and historically important selections from the *Annals* or the *Histories* of Tacitus are read, with attention to the literary style and the value of the historical narrative. 3 s.h. *Settle*

102. *Juvenal*. Juvenal's literary satire forms the basis of the course. 3 s.h. *Settle*

103. *Cicero*. Selections from one of the major philosophical works, with attention to Cicero's philosophical thought and literary style. 3 s.h. *Willis*

104. *Lucretius*. A study of Lucretius as a philosophical thinker and as a poetic artist. 3 s.h. *Willis*

105-106. *Latin Prose Composition*. Recommended to students who are pursuing courses 63, 64, 91, 92, and 97, and may at the discretion of the instructor be required of such students. 4 s.h.

191, 192. *Independent Study*. Directed reading and research. Open only to highly qualified students in the junior year, by permission of the department. See page 56. 6 s.h. *Staff*

205-206. *Mediaeval Latin*. Selections from representative writers in prose and poetry. Practice in dealing with microfilms of mediaeval Latin texts. 6 s.h. *Strugnell and Marti*

211-212. *Roman Oratory*. A reading course in the history and develop-

ment of Roman oratory, based for the most part on Cicero's *Brutus* and the *Dialogus* of Tacitus. 6 s.h. *Rogers*

253. Roman Elegy. The development of elegy with special emphasis on properties. 3 s.h. *Richardson*

Classical Studies

15. Mythology. A study of Greek myth and its cultural survivals. 3 s.h. *Truesdale and Wooley*

111-112. Roman Literature in English Translation. First semester, selective reading in important works of drama, lyric poetry, and Cicero; second semester, epic, satire, and the novel. 6 s.h. *Settle*

121, 122. Greek Literature in English Translation. First semester, the *Iliad* and *Odyssey* are studied in detail and related to their historical and literary background; second semester a study of Greek drama, with analysis of major plays of Aeschylus, Sophocles and Euripides. 6 s.h. *Truesdale and Stanley*

129. Greek History. The Greek world from the Late Bronze Age to the Roman conquest. Open to sophomores by permission of the instructor. 3 s.h. *Wooley*

131, 132. Roman History. A survey of the history of the Roman State from its beginnings to the death of Justinian; its expansion; development of its constitution and public administration; social, legal, political and economic problems of perennial life and interest; the background and setting of Christianity's rise and growth. 6 s.h. *Rogers*

141, 142. Classical Art and Archaeology. An illustrated survey of Greek and Roman art, with emphasis on the development of architecture, sculpture, painting and vase painting, and on the problems and methods of archaeological investigation. Study of the objects in the Duke Classical Collection, supplemented by slides. First semester, from the prehistoric to the classical period; second semester, from the late classical to the early Byzantine period, with emphasis on Rome. 6 s.h. *Stanley*

Departmental Major in Greek

Prerequisite. Greek 1-2.

Major requirements. 24 semester hours, including the following courses: Greek 63-64, 105-106, 107-108, 117-118, and Classical Studies 129.

Related work. Eighteen semester hours, selected usually in Latin, linguistics, philosophy, art, and English.

Departmental Major in Latin

Prerequisite. Latin 1-2, 63-64, or equivalent.

Major requirements. 24 semester hours which must include courses 91, 92, 101, 102, 103, 104, and 6 semester hours in courses at the 200-level.

Recommended Courses. Latin 105-106, Composition, and 131, 132, Roman History.

Related work. Eighteen hours of related work, elected usually in Greek, linguistics, philosophy, art, Romance Languages, and English. Majors who contemplate graduate work are reminded of the necessity of Greek, German, and French for such study.

Graduates of Duke University may attend the American School of Classical Studies at Athens, Greece, without charge for tuition and are eligible to compete for the fellowships that are offered annually by the School. These consist of two fellowships in Greek archaeology and one in the language, literature, and history of ancient Greece, each with a stipend of \$2,500. They are awarded mainly on the basis of examinations held in the beginning of February of each year. A somewhat similar connection exists with the American Academy in Rome.

Comparative Literature

The courses in Comparative Literature may be taken as electives by advanced students; certain courses serve as related work in several departments (see the entries for related work under the separate departments).

No major work is offered in Comparative Literature. Students interested in the study of the interrelationships of literature as a part of their undergraduate program, or as preparation for graduate work, should consult Mr. Salinger.

191, 192. *Independent Study.* Directed reading and research. Open only to qualified students in the junior year, by permission. See p. 56. 6 s.h. *Salinger*

193, 194. *Independent Study.* Directed reading and research. Open only to qualified students in the senior year, by permission. See p. 56. 6 s.h. *Salinger*

201, 202. *Romanticism.* Studies in the origin, rise, and development of the Romantic Movement in the chief literatures of the Western World. The approach is comparative; the principal emphasis will be on England, France, and Germany, with some reference to other countries. Selected subjects will be covered in occasional lectures by speakers from various departments of the University. 6 s.h. *Salinger*

203, 204. *Realism and Symbolism.* Comparative studies in the literatures of England, France, Germany, Russia, the Scandinavian countries, Spain and Italy, tracing the decline of romantic individualism and the reappraisal of man's significance against the social background. Selected subjects will be covered in occasional lectures by speakers from various departments of the University. 6 s.h. *Salinger*

205. *Foundations of Twentieth-Century European Literature.* The roots of the contemporary scene (Proust, Mann, Rilke, Kafka, Eyvind,

Johnson, Lagerkvist, Anouilh, Camus) evolving toward a mythology of man. 3 s.h. *Salinger*

For a description of the following courses see the departmental listing.

Readings in European Literature. (English 153, 154). *Heninger, Krueger, and Randall*

Modern European Drama. (English 155) *Reardon*

Readings in Scandinavian Literature. (English 159) *Anderson*

The European Epic Tradition. (English 167, 168) *Knight*

Religious Values in Classical and European Literature. (Religion 187).
Kort

Economics and Business Administration

Professor Smith *Chairman*; Professor Joerg, *Director of Undergraduate Studies*; Professors Black, de Vyver, Dickens, Ferguson, Hanna, Hoover, McGee, Rottenberg, Saville, and Spengler; Associate Professors Blackburn, Davies, de Alessi, Gerhard, Goodwin, Keller, Kreps, and Yohe; Assistant Professors Finger, Keane, Naylor, Pethia, Reed, and Wallace; Visiting Assistant Professors (Part-time) Galifianakis and Hahn

The courses offered by the Department are listed under three divisions, Economics, Accounting, and Business Administration.

In general, the Economics courses aim to develop in the student such critical and analytical skills as underlie the ability to understand economic problems and institutions, both in their contemporary and in their historical setting. While no particular vocational or professional goal is emphasized, these courses furnish the academic background necessary for many positions in industry, for work in the economic branches of government service, and for graduate study in economics and the social sciences.

Courses in Accounting and Business Administration, although more concerned with general principles than with specific applications, stress in greater measure than courses in Economics the knowledge and techniques useful to students definitely preparing for business careers. The student who majors in Accounting may elect courses in accountancy, business law, and related work, sufficient to qualify for admission to C.P.A. examinations.

Economics 1 or 51 and 2 or 52 are recommended to all students planning to elect further courses in Economics and Business Administration.

Economics

1. *Introduction to Economic Problems and Policies.* The present-day American economy and the challenge from centrally planned economies; policies to deal with problems of depression, inflation, growth, and automation. 3 s.h. (E & W) (Open only to Freshmen.) *Staff*

2. *The Evolution of Economic Ideas.* A study of man's economic activities and his ideas about them, from the ancient world to the present day. Emphasis is given to the historical roots of important contemporary economic ideologies. 3 s.h. (E & W) (Open only to Freshmen.) *Staff*

51. *Principles of Economics.* Examination of the main features of the American economy, measurement of national income, and analysis of forces determining national output and income; fluctuation and growth of output, monetary and fiscal policies for stability and growth. 3 s.h. (E & W) *Staff*

52. *Principles of Economics.* Examination of forces determining prices and production of goods, distribution of income; problems of agriculture, labor, international trade, economic development, and government in relation to business. 3 s.h. (E & W) *Staff*

132. *The Economic History of the United States.* Development of economic institutions as the United States passed from a wilderness area to an industrial society. Special attention is given to measures of economic change and their application to models of economic growth and fluctuation. 3 s.h. (W) *Saville*

149. *The Theory of the Firm.* Cost and supply considerations in price theory, the demand for factors of production. The allocation of resources is examined in the context of competitive and monopolistic market structures. 3 s.h. (W) *de Alessi*

150. *Economic Thought Since Adam Smith.* A course of readings in leading economic writers of the nineteenth and twentieth centuries. 3 s.h. (W) *Goodwin*

153. *Money and Banking.* The lender's side of financial markets. The activities of commercial banks and other financial institutions in supplying loanable funds and the effects of these activities on the money supply and its rate of use, the impact of central bank and Treasury operations on financial markets, and the evolution of the present monetary system and its institutions. 3 s.h. (W) *Yohe*

154. *Aggregative Economics.* Concepts and measurement of national income and expenditures, employment, and price levels; the theoretical determination of these aggregates; and applications of macro-economic theory to business cycles and economic growth. 3 s.h. (W) *Blackburn, Yohe*

155. *Labor Problems.* An examination of present-day labor problems followed by an intensive study of methods used by employers and workers in meeting those problems. 3 s.h. (W) *de Vyver, Mrs. Kreps*

160. *The Political Economy of Europe: Recent Developments.* A study of changing economic relations between European countries and of the changing position of Europe in the world economy after World War II. Selected topics of an interdisciplinary nature will be discussed by visiting lecturers. (W) *Gerhard*

161. *European Economic Problems.* An application of the theory of

international economics to the problems of international economic integration with emphasis on the European Common Market. 3 s.h. (w) *Gerhard*

189. *Business and Government.* A survey of the public policies which most directly affect the operation of competition in the business world. The course considers the leading philosophies of public control and economic development, the validity of their presuppositions, and their influence on legislation, court decisions and administrative law. 3 s.h. (w) *McGee*

201. *Senior Seminar in Economics.* Problems in theory and applied economics. Readings, reports, and discussion of selected topics. For majors in Economics, with consent of the Department. 3 s.h. (w) *Staff*

204. *Advanced Money and Banking.* Monetary theory and its statistical and institutional implementation. Particular attention is given to the development of aggregative theories of prices, interest rates and production; the functioning of monetary policy within various theoretical frameworks; and appraisal of the recent use and the limitations of Federal Reserve policy. 3 s.h. (w) *Yohe*

218. *Business Cycles.* The characteristics and measurement of cyclical fluctuations in output, employment, and prices; an historical survey of business cycle theories; modern macroeconomic theory and public policy as they relate to business cycles and associated problems of economic growth; techniques of forecasting cycles. 3 s.h. (w) *Yohe*

219. *Economic Problems of Under-Developed Areas.* Consideration and analysis of the economic and related problems of under-developed countries. Some attention will be given to national and international programs designed to accelerate the solution of these problems. 3 s.h. (w) *Rottenberg, Spengler*

231. *Economic History of Europe.* The economic development of Europe from medieval times to the present, treating such topics as the guilds, mercantilism, money, banking, crises, the Industrial Revolution, the interrelationships of government and business, and the economic consequences of war. 3 s.h. (w) *Smith*

233. *State and Local Finance.* A study of expenditures, taxation, and financial administration in state and local governments with emphasis on current problems. Special attention will be given to research methods and materials and to the financial relations between state and local governments. Prerequisite: Economics 287 or consent of instructor. 3 s.h. (w) *Davies*

237, 238. *Statistical Methods.* A study of statistical methods appropriate for dealing with problems in business and social science. In addition to developing more thoroughly the subject considered in *Business Statistics*, the following methods will be considered: simple, multiple, partial, and curvilinear correlation; curve fitting; probability; sampling distributions; and statistical inference. Prerequisite: Economics 138 or consent of the

instructor. *Either semester* may be taken for credit. 6 s.h. (w) *Hanna and Wallace*

243. *Econometrics I.* Economic theory, mathematics, statistical inference, and electronic computers applied to analysis of economic phenomena. Objective is to give empirical content to economic theory. Matrix algebra used to develop topics in inference, linear regression, and systems of simultaneous equations. Use is made of the electronic computer. 3 s.h. (w) *Naylor*

244. *Econometrics II.* A course on the design of computer simulation experiments for economic systems. Topics include generation of stochastic variates, computer models of queueing and inventory systems, models of the firm and industry, models of the economy, simulation languages, and experimental design. 3 s.h. (w) *Naylor*

257. *Dynamics of the Labor Movement.* A study of the forces which have shaped the growth of the labor movement. Special emphasis on the origin of modern trade unionism, relating its growth with western philosophic developments, and with the changing economic and social structure of society in Europe and America. 3 s.h. (w) *Goodwin*

262. *Trade Unionism and Collective Bargaining.* An intensive survey of the trade union as an economic institution is followed by a study of the principles and problems of union-management relationship as found in collective bargaining. 3 s.h. (w) *de Vyver*

265. *International Trade and Finance.* A study of fundamental principles of international economic relations. Subjects covered include the economic basis for international specialization and trade, and the economic gains from trade, the balance of international payments, problems of international finance, of international investments, and international monetary problems. 3 s.h. (w) *Gerhard*

268. *Competition and Monopoly.* A detailed study of the varieties of imperfectly competitive markets, the economic and legal issues which they raise, and the policy solutions which have been attempted in the United States. 3 s.h. (w) *McGee*

286. *Latin American Economics.* A survey of the problems of economic development in twenty countries. 3 s.h. (w) *Smith*

287. *Public Finance.* An analysis of the impact of governmental expenditures, revenues, and debt on the allocation of resources, the redistribution of income, and the stabilization of income. 3 s.h. (w) *Davies*

293. *Economic Systems.* A study of alternative economic systems. An historical and analytical study of the basic elements of capitalism and of collectivist types of economic systems. Particular attention is given to an analysis of the economic system of Soviet Russia. Prerequisite: permission of the department. 3 s.h. (w) *Hoover*

294. *Economic Functions of the State.* A continuation of Economics 293. A consideration of the economic functions of society and of the contrasting roles of the state in the various economic systems in carrying

on these functions. The Nazi system, the quasisocialized economics of Europe, as well as the modifications of old-style capitalism in the United States are analyzed. Prerequisite: Economics 293. 3 s.h. (w) *Hoover*

Accounting

57. Principles of Accounting I. Provides a basic knowledge of accounting and a consideration of financial statements. Attention is focused on the nature and purpose of accounting, the measurement and classification of economic data, and accounting reports as a tool of management and the investor. 3 s.h. *Staff*

58. Principles of Accounting II. The problems of accounting for the control of monetary assets and costs, the problems of capital stocks and the elementary problems of decision making. The relationship of the firm and national income accounts is examined. Prerequisite: Economics 57. 3 s.h. *Staff*

147. Accounting for Control. This course traces the ways and means of executive control through statistics and industrial accounting. Emphasis is placed upon controlling business enterprises through cost accounting, financial reports, and other techniques. This course is not open to accounting majors. Prerequisite: Economics 57-58. 3 s.h. (w) *Black and Joerg*

171. Accounting Theory. Basic concepts, principles, and postulates are examined and related to the objective of income determination and asset valuation. Financial statements as a source of economic data and investor information are the focal points of the course. Prerequisite: Economics 58. 3 s.h. (w) *Keller*

172. Corporate Accounts. Deals with the complex problem of capital structure and debt. Considers in detail the effect of fluctuation in the purchasing power of the dollar on business affairs. Examines critically the many faceted problem of measuring and appraising business performance. Studies the many aspects of business combinations and foreign operations. Prerequisite: Economics 171. 3 s.h. (w) *Keller*

178. Accounting Systems. A presentation of the design and use of basic accounting procedures as applied to specialized business needs. Field trips to selected business units will be arranged. Prerequisite: Economics 171, 172 and the permission of the department. 3 s.h. (w) *Dickens*

180. Governmental Accounting. Accounting principles and methods used in the control and administration of governmental units. Emphasis is placed upon state, county and municipal governments. Prerequisite: Completion of or registration for Economics 171, 172. 3 s.h. (w)

273, 274. Auditing, Theory and Practice. A study of basic auditing objectives, standards, ethics, terminology, procedures, and reports. Accounting principles and statement presentation are studied from the viewpoint of the auditor. The place and responsibility of both the internal auditor

and the public auditor are studied. Prerequisite: Economics 171, 172 and permission of the department. 6 s.h. (w) *Dickens*

275, 276. *Advanced Industrial Accounting and Management.* A comprehensive examination of the rationale and techniques of control methods used in industry. Emphasis is laid on a critical evaluation of the practices followed by job-order, process, and standard costing as well as the economics of overhead costs. Prerequisites: Economics 171, 172 and permission of the department. 6 s.h. (w) *Black*

277. *Income Tax Accounting.* Presentation of the principles of Federal Income Tax laws as related to individuals, partnerships, estates, trusts and corporations. Prerequisite: Completion of or registration for Economics 171, 172. 3 s.h. (w) *Keane*

278. *Advanced Problems in Income Taxation.* A critical appraisal of selected topics in the law of income taxation as it relates to corporations, partnerships, estates, and trusts. 3 s.h. (w) *Keller*

279. *Budgeting and Control.* A consideration of methods used in period and project budgeting; the use of accounting, statistical, and mathematical methods in cost control; the use of numerical data in making decisions among alternative courses of action. 3 s.h. (w)

295, 296. *Advanced Accounting Seminar-Theory and Practice.* Thorough practice in classroom to prepare candidates for the Certified Public Accountant examination. The object is to train students to apply accounting principles and to work in classroom under substantially the same conditions as in the examination rooms. Practical accounting problems, auditing analysis and theory of accounts. Prerequisite: Economics 171, 172 and permission of the department. (*Those who do not wish credit may take Economics 295, 296 for \$25.00 per semester.*) 6 s.h. (w) *Black*

Business Administration

109. *Economic Geography of Latin America.* This course involves comprehensive study of the resources and people of Mexico, the West Indies, and Central and South America. Special emphasis is placed upon the possibilities and limitations of increases in trade between the United States and the leading Latin-American countries. 3 s.h. (E)

114. *Economic Geography of Africa.* A continental study of the natural environmental factors of Africa and the basic economic patterns of adjustments and adaptations on regional or national bases. Prerequisite: Economics 115 or 120. 3 s.h. (E) *Tuthill*

115. *Fundamentals of Geography.* A study of geographic influences consisting of location, maps and their interpretation, climate, topography, soils, minerals, bodies of water, plants, animals, and the works of man. This course is required of all students in the Elementary School Teaching

program, and is also recommended for those intending to specialize in foreign trade or the diplomatic service. 3 s.h. (E) *Reed*

120. *Economic Geography of the Pacific.* An analysis of the physical influences, natural resources and economic activities of the Orient. 3 s.h. (E) *Tuthill*

138. *Business Statistics.* A survey of the principal statistical methods and their application to economics and business administration. The course deals with collection of statistical data, construction of statistical tables and charts, and a brief study of the fundamental statistical concepts and techniques. Offered both semesters. 3 s.h. (w) *Hanna and Wallace*

Open to juniors and to sophomores in the second semester. Not open to seniors except with permission of the Director of Undergraduate Studies.

143. *Corporation Finance.* Principles and problems in the financial organization of corporations; the study of corporate securities, the management of capital, the distribution of earnings; industrial combinations; insolvency and reorganization. Prerequisite: Economics 57. Offered both semesters. 3 s.h. (w)

144. *Investments.* A study of the investment policies of individuals and institutions; the securities markets; sources of investment information and data; the analysis and interpretation of financial statements. Prerequisite: Economics 143. 3 s.h. (w) *Keane*

146. *Managerial Economics.* Economic analysis of the business firm, its goals, and the economic environment of business. Economic theory of the firm; various mathematical models of the firm; the internal decision making processes. No credit for those who have completed Economics 149. 3 s.h. (w) *Naylor, Wallace*

181. *Business Law.* The fundamental principles of law as applied to routine business transactions. The topics presented are: contracts, agency, and negotiable instruments. 3 s.h. (w) *Galifianakis*

182. *Business Law.* A continuation of 181. The topics presented are: partnerships, corporations, sales, personal and real property, mortgages, suretyship, bankruptcy and trade regulation. 3 s.h. (w) *Galifianakis*

184. *Commercial Law for Accountants.* A review and summation of commercial law principles as they apply to accounting theory and practice. Emphasis will be placed upon the commercial law sections of the Certified Public Accountant examinations. Students are admitted to the course by permission of the instructor. *For seniors.* 3 s.h. (w) *Black*

185. *Business Administrative Organization.* An analysis of human behavior in administrative organizations followed by a critical examination of alternative theories of administration and organization as relevant to the business firm. 3 s.h. (w) *Pethia*

188. *Personnel Management.* A study of the fundamental principles and problems of labor management and of collective bargaining under

modern industrial conditions and under existing labor legislation. 3 s.h. (w) *Pethia*

190. Quantitative Methods in Business. Introduction to operations research. Application of mathematics, statistics, and electronic computers to the solution of management problems. Topics include linear programming, inventory models, queuing theory, Markov processes, and computer simulation. 3 s.h. (w) *Naylor*

249. Product Markets. Consumer behavior in price theory, the demand for final products. Relates the firm's demand to the type of market structure, and examines the firm's attempts to predict demand, its attempts to influence demand, and its price policies. 3 s.h. (w)

291. Business Policy. An integrating course where, through analysis of a series of case problems from the top management viewpoint, the student is given practice in arriving at effective courses of action to solve business problems. To complete this course satisfactorily the student will be required to draw upon the institutional knowledge and techniques acquired in the other courses in the department. Prerequisites: Business Administration requirements through the junior year. 3 s.h. (w) *Joerg*

Departmental Majors

The Department of Economics and Business Administration offers specialization in three major areas—Accounting, Business Administration and Economics. Each program requires that the student take the same required prerequisite courses in the Freshman and Sophomore years.

Prerequisites required of all majors in the Department. Mathematics 17 or 21 (Preferably Mathematics 21). Economics 1 or 51 and 2 or 52. Economics 57.

Number of hours needed in each major area. 21 s.h. in addition to Economics 1 or 51 and 2 or 52 and Economics 57.

Economics

Required courses. Economics 138, 149, 154.

Elective courses. Any 12 hours selected from the Economics section (not Accounting or Business Administration) of the Departmental course offerings. Economics 143 and 190 from the Business Administration section may also be offered to meet the Elective requirement.

Business Administration

Required courses. Economics 58 (should be taken in Sophomore year) Economics 138, 143, 146, 291.

Elective courses. 6 hours selected from the following courses. Economics 144, 185, 190, 249.

Accounting

Required courses. Economics 58 (should be taken in the Sophomore Year). Economics 138, 143, 171, 172, 273, 275.

Related work. 18 s.h. Departments in which related work is usually taken. Mathematics, the other social sciences, history, and psychology. In special cases courses taken in other departments may be counted as related work with the approval of the Department and the dean.

The Department offers work leading to graduation with distinction. See the section on Honors.

Education

Professor Nelson, *Chairman*; Professor Stumpf, *Director of Undergraduate Studies*; Professors Bolmeier, Cartwright, Githens, Hopkins, Hurlburt, and Petty; Associate Professors Colver, Gehman, Johnson, Rudisill, Shuman, Spaulding, Sublett, and Weitz; Assistant Professors Ballantyne, Martin, and Simono

Courses in the Department of Education are designed for two groups of students: (1) students who have definitely chosen teaching as their life work or others with teaching experience, and (2) students who desire to study the school as a unique social institution.

Students who expect to teach in the public schools should plan their courses in accordance with the general regulations set forth under Teaching. Students who intend to teach in elementary schools should advise with Professors Petty, Rudisill, Sublett, or Stumpf; those intending to teach in secondary schools should advise with Professors Cartwright, Githens, Hurlburt, Shuman, or Stumpf. Students should confer with these advisers prior to registration each semester.

Students who do not expect to teach but desire an understanding of the school as part of a liberal education are advised to elect such courses as Education 100, 113, 114 for their introductory work in the Department and then to elect further work in accordance with their special interests.

5. *Developmental Reading.* A course consisting of study and practice for the improvement of the reading and study skills. Work is provided in such areas as vocabulary, speed of comprehension, critical interpretation, organization of ideas, and versatility of method in reading for different purposes. 3 s.h. (w) *Miss Rudisill*

68. *Mental Hygiene.* Development and application of psychological principles of adjustment to personal behavior. Study of factors in the development of personal adjustment as influenced by human relations in the home, school, and community. Not open to students who have had Psychology 115. 3 s.h. (E) *Gehman*

100. *Social Foundations of American Education.* A study of the basic features, assumptions, viewpoints, and issues of education in contemporary America. This course or Education 113 is required of all who intend to practice teach and of all majors in Education. This course should be

taken in the junior year. *Either semester.* 3 s.h. (E) *Johnson, Martin, Stumpf, and Sublett*

101. *Elementary Education: Principles.* The nature, subject matter, and organization of elementary education for instruction in the primary and intermediate grades. Required in the elementary-education major. 2 s.h. (E) *Petty, Sublett*

102. *Elementary Education: Practice.* Methods and problems of instruction in elementary education and their applications and solutions in the classroom. Required in the elementary-education major. Prerequisite: 2.0 average over-all and in the elementary-education major. 6 s.h. (E) *Petty, Sublett*

105. *Elementary Education: Reading.* The process, methods, and materials basic to the teaching of reading in the elementary school. Required in the elementary-education major. 2 s.h. (E) *Miss Rudisill*

106. *Elementary Education: Language Arts.* The processes, methods, and materials basic to the teaching of the language arts in the elementary school. Required in the elementary-education major. *Either semester.* 2 s.h. (E) *Rudisill*

107. *Elementary Education: Arithmetic.* The processes, methods, and materials basic to the teaching of arithmetic in the elementary school. Required in the elementary-education major. 2 s.h. (E) *Petty*

108. *Elementary Education: Science.* The principles, methods, and materials basic to the teaching of the sciences in the elementary school. Required in the elementary-education major. 2 s.h. (E) *Githens*

113. *History of American Education.* A study of American education from colonial times to the present. The development of schools, their organization, administration, curriculum, and methods as seen in relation to the social forces that have produced our particular type of civilization. 3 s.h. (E) *Johnson*

114. *History of Education in European Culture.* A study of the evolution of educational theory and practice from Greek civilization through 19th-century Europe. Emphasis will be placed upon the educational ideas of outstanding thinkers from Plato to Spencer. 3 s.h. (E) *Johnson*

118. *Educational Psychology.* A study of the psychology of learning, individual and social development, and psychology of adjustment as related to problems of instruction and the processes of education. Prerequisite: Psychology 91. 3 s.h. (E) *Ballantyne, Gehman, Simono*

142. *Children's Literature.* Students may specialize in literature of either the primary or the grammar grades. 3 s.h. (E) *Rudisill*

151. *Public School Music Education.* Required in the elementary-education major. See Music Education 151 for description.

152. *Public School Music Literature.* Required in the elementary-education major. See Music Education 152 for description.

153. *Vocal Music in the Public School.* See Music Education 153 for description.

154. Instrumental Music in the Public School. See Music Education 154 for description.

161. Integrated Art in the Public School. Work in materials and methods applied in two-dimensional art. Required in the elementary-education major. *Either semester.* 2 s.h. (E) *Stars*

162. Plastic Art in the Public School. Work in basic three-dimensional art, giving an understanding of different sculptural media with special emphasis on ceramics. The course is designed for students in elementary and secondary art education, and will provide credit toward the North Carolina Elementary and Secondary Teaching Certificates. 3 s.h. (E) *Stars*

201. Teaching and Supervision of Arithmetic. Special attention is given to the number system, the fundamental operations (with whole numbers, fractions, and decimals), percentage, and measurements. Considered also are the meaning theory, methods of teaching, problem solving, evaluation, practice and drill, and selection and gradation of arithmetical contents. This course is designed for teachers and supervisors in the elementary school. 3 s.h. (E) *Petty*

203. Principles of School Administration. The fundamental facts and procedures of school administration, and analysis of the problems and policies of the organization and direction of a local school system, and the functions of the various school officials. Prerequisite: six semester hours in education. 3 s.h. (E) *Bolmeier, Hurlburt, and Stumpf*

204. The School as an Institution. Consideration is given to the place of the school in the American social order, and its adaptation to social, economic, and political changes. Special attention is directed to the responsibility (1) of the school for seeking solutions to the perplexing problems of youth created by a changing society; and (2) of the government for providing greater equality of educational opportunities. 3 s.h. (E) *Bolmeier, Martin, Nelson*

210. Introduction to Educational Research. The general purpose of this course is to give the student an overview of research, acquaint him with the nature of research processes, and develop within him an understanding of the essential characteristics of good research work. The course is designed to be liberalizing as well as technical. 3 s.h. (E) *Stumpf*

215. Secondary Education: Principles. Intensive study of principles, curriculum, and methods in secondary education. Accelerated course meeting six hours a week for half a semester. Prerequisite: 2.0 average overall and in teaching field or fields. Must be accompanied by Education 216. *Either semester.* 3 s.h. (E) *Cartwright, Githens, Hurlburt, Shuman*

216. Secondary Education: Internship. Supervised internship in junior or senior high schools. Full-time observation and teaching for half a semester, accompanied by Education 215. Prerequisite: 2.0 average over-

all and in the major or teaching field. *Either semester.* 6 s.h. (E) *Cartwright, Githens, Hurlburt, Shuman*

Note: Education 215, 216, 118, and one other course, depending on the student's field, constitute a semester's work during the senior year.

217. *The Psychological Principles of Education.* An advanced study of teaching, learning, and the learner. Selected problems guiding the reading of students will be discussed in class. 3 s.h. (E) *Gehman, Weitz*

225. *The Teaching of History and the Social Studies.* Evaluation of the objectives, content, materials and methods in the teaching of history and the social studies. 3 s.h. (E) *Cartwright*

226. *Teaching Reading in the Elementary School.* A study of the nature of the reading process and of principles, methods and materials for the development of effective reading attitudes and skills as applied both to developmental and remedial programs. Practice is provided with elementary-school children suffering reading retardation, in testing, diagnosis, and daily remedial teaching. 3 s.h. (E) *Rudisill*

228. *Improvement of Instruction in the Social Studies.* An advanced treatment of curriculum, methods, and materials in the social studies. Individuals will concentrate on subjects and grade levels of their choice. 3 s.h. (E) *Cartwright*

232. *Supervision of Instruction.* A survey of supervision as a means of improving instruction and adapting the curriculum to the learner and to community needs. 3 s.h. (E) *Hurlburt*

234. *Secondary-School Organization and Administration.* This course is designed especially for principals, teachers, and other prospective members of the secondary-school staff. The scope of secondary education is considered to encompass junior high school, regular high school, senior high, and junior college. Special treatment is given to the problems of internal organization and management. 3 s.h. (E) *Bolmeier, Nelson*

235. *The Nature, Function, and Reorganization of the Curriculum.* Selected problems, and guiding students' reading. 3 s.h. (E) *Cartwright, Sublett*

236. *Teaching Reading in the Secondary Schools.* A study of the nature of the reading process and of principles, methods, and materials for the development of effective reading attitudes and skills as applied both to developmental and remedial programs. For secondary-school teachers of all subjects who wish to improve the reading and study habits of their students. 3 s.h. (E) *Rudisill*

237. *Literature for Adolescents.* The course offers a critical survey of literature written for, or appropriate for junior and senior high school students. Fiction, non-fiction, biography, poetry, and drama are examined. Both adult and transition-type literature are considered. Methods of organizing the program in literature are explored. 3 s.h. *Shuman*

239. *Methods and Problems of Teaching English in Secondary Schools.* This course will present sound methods of teaching the reading of litera-

ture and other forms of writing, language, grammar and composition. Materials will include selections found in widely adopted textbooks, numerous specimen themes for grading, and current books and articles in the field. Several short compositions and a report will be required. 3 s.h. (E) *Bowman, Shuman*

240. *Educational and Occupational Information.* A study of the sources of occupational and educational information; methods of securing and organizing occupational information; methods of providing vocational and educational information to students through career days, college conferences, class activities, and individual counseling; methods of making job analyses and community occupational surveys. 3 s.h. (W) *Colver*

241. *Principles of Guidance.* An historical survey of the philosophies of guidance; a study of the interrelationships between instruction, administration, and guidance in education. Prerequisite: 6 hours of psychology or educational psychology. 3 s.h. (W) *Colver*

243. *Personality Dynamics.* A study of personality structure and dynamics with emphasis upon the implications for counseling and instruction. Prerequisite: 6 hours of psychology or educational psychology. 3 s.h. (E) *Gehman*

246. *The Teaching of Mathematics.* This course deals with such topics as aims, curriculum, course and lesson planning, and classroom procedure for teaching secondary-school mathematics. 3 s.h. (E) *Reynolds*

253. *School Law.* The primary purpose of this course is to familiarize prospective school administrators and teachers with the legal features of school organization and administration. Although some attention is given to constitutional and statutory provisions, the main emphasis is upon court decisions relating to education. Students are expected to select appropriate problems in school law for intensive study. 3 s.h. (E) *Bolmeier*

258. *Educational Measurements.* A critical study of the principles and techniques involved in measurement in education with opportunity for individual research. Prerequisite: 12 semester hours in the Department, including a course in educational psychology. 3 s.h. (E) *Colver, Weitz*

266. *Science in the Elementary School.* Presentation of basic concepts in natural and physical science through selected readings, the use of simple experiments and demonstrations, construction and use of equipment, and field studies. 3 s.h. (E) *Githens*

276. *The Teaching of High-School Science.* Discussion, lectures and collateral reading related to such topics as aims, tests, curriculum, classroom and laboratory procedure, field trips, course and lesson planning for secondary-school science. 3 s.h. (E) *Githens*

290. *Administration of School Property.* Planning and management of the school plant and its equipment to meet instructional and community needs for immediate and long-range purposes. This course is intended for teachers and principals as well as for superintendents. Areas to be treated

include site selection; trends in design, lighting, ventilation and heating; custodial service and maintenance; and financing. 3 s.h. (E) *Stumpf*

Departmental Major

The only undergraduate majors in Education at Duke University are those in elementary and science education.

The Department offers work leading to graduation with distinction. See the section of Honors in this *Bulletin*.

Materials and Methods Courses

Certain courses concerned with materials and methods in teaching the various subjects in the public school curriculum are listed in the proper subject matter department. These courses are intended to give credit for teaching certificates and are recommended by the Department of Education for such credit.

Majors in Elementary Education and Science Education

Students desiring to teach in elementary schools or in science in secondary schools should read the descriptions of these programs of study listed under the proper headings elsewhere in this *Bulletin*.

Engineering

For courses in Civil, Electrical, and Mechanical Engineering, see page 184.

English

Professor Stevenson, *Chairman*; Associate Professor Ferguson, *Director of Undergraduate Studies*; Professor Patton, *Supervisor of Freshman Instruction*; Professors Blackburn, Bowman, Boyce, Duffey, Gohdes, Knight, Lievsay, Nygard, Sanders, Turner, and Ward; Associate Professors Anderson, Bevington, Budd, Harwell, Heninger, Reardon, Smith, Wetherby, and Williams; Assistant Professors Gerber, Jackson, Jennings, Jones, Jordan, Krueger, Mellow, Michalak, Monsman, Moore, Price, Randall, Schwerman, and van Kluyve; Instructors Applewhite, Byrd, Houck, and Robinson; Lecturer Rottenberg

1-2. Freshman Composition. Training in composition through the writing of weekly expository themes. The theme subjects derive from assigned reading drawn from British and American literature of the Twentieth

Century. English 1 takes up the Essay, the Short Story, and the Novel; English 2, the Play and the Poem. The student attends each week (1) a general lecture on the reading for the week; (2) a section meeting, where the instructor and a small group discuss problems of composition and literature; and (3) an individual conference in which the instructor reads and grades the weekly theme and makes special assignments according to the needs of the student. 6 s.h. (E & W) *Staff*

53. *Advanced Grammar and Writing.* Emphasis is placed first on the student's mastering the fundamental principles of English grammar and the other essentials of correct writing. 3 s.h. (E) *Jordan*

65-66. *Imaginative Writing.* A foundation course in imaginative writing, both prose and verse. Primarily for sophomores, but in special cases open to students from other classes. The consent of the instructor is required. 6 s.h. (E) *Sanders*

93. *Technical Communication.* Emphasis will be placed on the writing of business letters, technical reports, and articles for submission to technical journals. Approximately one-third of the course will provide training in the oral presentation of various materials. Primarily for students in Engineering. Prerequisite: English 1 and 2. 3 s.h. (W) *Harwell and Staff*

100. *English for Foreign Students.* Designed to assist the student to whom English is a second language to perfect his speaking and understanding of the language. Drills in writing, speaking, listening, and the American idiom. Open to all students and their wives, and to any persons and spouses with an official connection with the University. Those who do not pay full-time student fees may register for a fee of \$5.00. No credit. (W) *Wetherby*

101. *Advanced Expository Writing.* Designed for students interested in expository writing, this is a course in advanced composition. Primarily for juniors and seniors; open also to sophomores approved by the instructor. 3 s.h. (E) *Ferguson*

103-104. *Narrative Writing.* Class discussion of students' manuscripts, supplemented by a critical evaluation of selected short stories and a novel and by individual conferences with the instructor. Open to sophomores, juniors, and seniors. Students desiring admission to the course should present a piece of writing to the instructor as early as possible in the spring semester. Prerequisite for English 104: English 103. 6 s.h. (E) *Blackburn*

Speech and Drama

51. *Essentials of Public Speaking.* A basic course in public speaking, designed to give the student the poise and confidence necessary to think and speak freely before an audience. Particular attention is paid to the gathering and organization of speech materials and to oral presentation.

Not open ordinarily to juniors and seniors. 3 s.h. (w) *Michalak, Reardon, and Schwerman*

118. *Persuasive Speaking.* The psychological and sociological techniques used in gaining acceptance of ideas through speech. Study is made of the factors influencing human behavior; audience analysis and motivation; choice, arrangement, and adaptation of material. Extensive practice in persuasive speaking. Prerequisite: English 51 or 151 or consent of the instructor. 3 s.h. (w) *Wetherby*

119. *History of the Theater.* The origin and development of drama, acting, and stagecraft from ancient Greece to the modern European and American theater. Production problems of representative plays of the various periods will be discussed. Primarily for juniors and seniors; open also to sophomores approved by the instructor. 3 s.h. (w) *Michalak*

121. *Stagecraft.* An introductory course on the technical aspects of play production: scenery, lighting, properties, make-up, and costuming. Laboratory work will be coordinated with the various productions of the Duke Players. Primarily for juniors and seniors; open also to sophomores approved by the instructor. 3 s.h. (E) *Michalak*

122. *Play Production.* An introduction to the methods of producing a play; theater organization, play selection, casting, and rehearsal. Lectures and laboratory. Primarily for juniors and seniors; open also to sophomores approved by the instructor. 3 s.h. (E) *Michalak*

139. *The Speaking Voice.* A study of the mechanisms of speech. Emphasis is placed on providing the skills necessary for the improvement of voice, pronunciation, and diction. Methods of correcting minor functional speech disorders will also be studied. 3 s.h. (w) *Schwerman and Wetherby*

150. *Oral Interpretation of Literature.* A study of poetry and certain types of prose, with practice in the technique by which they may be communicated to an audience. 3 s.h. (w) *Schwerman*

151. *Essentials of Public Speaking.* A basic course in public speaking for juniors and seniors dealing with the same matters as 51. (Not open for credit to students who have taken 51.) 3 s.h. (E & w) *Michalak, Reardon, and Schwerman*

152. *Argumentation.* The principles of argumentation and debating. The techniques of analysis, investigation, evidence, reasoning, brief making, and refutation. Participation in class discussions and debates. Prerequisite: English 51 or 151 or consent of the instructor. 3 s.h. (w) *Wetherby*

171, 172. *Broadcasting.* A study of the background of radio and television broadcasting. The first semester covers the development of broadcasting as an industry and as a literary form. The second semester studies the legal and social aspects, and the various program forms. 6 s.h. (w) *Wetherby*

English and American Literature and Language

55, 56. Representative British Writers. The following works are studied in the first semester: Chaucer's Prologue to *The Canterbury Tales* and at least two tales, Shakespeare's *I Henry IV*, *Hamlet* or *King Lear*, and one other play, John Donne's poetry (selections), Milton's *Paradise Lost* (selections) and some of the shorter poems; in the second semester: novels by Fielding (*Joseph Andrews*) and Dickens (*Great Expectations*), and selections from the poetry of Pope, Wordsworth, Keats, and Yeats. 6 s.h. (E & W) Staff

57, 58. Representative American Writers. Selections and complete works. The first semester will include Poe, Emerson or Thoreau, Hawthorne, Melville, Whitman, Dickinson, and Twain; the second will include James, Frost or Robinson, Crane or Dreiser, O'Neill, Faulkner, Hemingway, and others. 6 s.h. (E & W) Staff

111, 112. Eighteenth-Century Literature. The writers emphasized in the first semester are Pope, Swift, Defoe, Addison, Steele, and Fielding; in the second semester, Johnson, Gray, Boswell, Goldsmith, Sheridan, the later novelists, and Blake. 6 s.h. (E) Boyce, Ferguson, and Ward

117. Milton. Milton's poetry and prose, together with their relation to the period and to other great works of literature. 3 s.h. (E) Lievsay

123, 124. Shakespeare. In the first semester twelve plays, before 1600; in the second semester about ten plays, after 1600. 6 s.h. (E & W) Bowman, Heninger, Randall, Ward, and Williams

125, 126. English Literature, 1789-1832. The course begins with selections from the poetry of the forerunners of Romanticism. The chief emphasis in the first semester is on the work of the older Romantics: Wordsworth, Coleridge, Lamb, and Hazlitt. In the second semester the chief emphasis is on the work of the younger Romantics: Byron, Shelley, Keats, and DeQuincey. 6 s.h. (W) Patton

127. The English Novel From The Beginnings to 1800. Some of the writers studied are Nashe, Deloney, Lyly, Sidney, Bunyan, Behn, Defoe, Richardson, Fielding, Smollett, and Sterne. (Not open for credit to students who have taken 157.) 3 s.h. (E) Randall

128. The English Novel in the Nineteenth Century. Some of the writers studied are Scott, Austen, Dickens, Thackeray, Trollope, the Brontës, George Eliot, Meredith, Butler, and Hardy. (Not open for credit to students who have taken 157.) 3 s.h. (E) Ferguson

129. The English Novel in the Twentieth Century. Some of the writers studied are Conrad, Lawrence, Forster, Joyce, Woolf, Huxley, Cary, Amis, and Golding. (Not open for credit to students who have taken 158.) 3 s.h. (E) Mellown and Smith

131, 132. English Literature, 1832-1900. A study of the major writers of poetry and prose from Macaulay to Hardy. The authors studied in the

first semester are Macaulay, Tennyson, Carlyle, the Brownings, Newman, Mill, Clough, and FitzGerald; in the second semester, Arnold, the Rossettis, Ruskin, Patmore, Meredith, Huxley, Morris, Swinburne, Pater, and Hardy. Collateral reading from novels of the period. 6 s.h. (E) *Harwell, Sanders, and Stevenson*

133, 134. *Twentieth-Century Poetry.* A study of twentieth-century poetry and criticism of poetry in England and America. Problems in critical analysis and interpretation. First semester: the emphasis is on sources in nineteenth-century Symbolism and on the poetry of Hopkins, Yeats, Eliot, Pound, and Stevens. Second semester: the emphasis is on the poets and the poetic theories of the last thirty years. 6 s.h. (E) *Bevington*

137, 138. *American Literature.* A survey from colonial times to the present. Selections and complete novels by Hawthorne and Melville in the first semester; Twain, Henry James, Howells, and others in the second. (Not open for credit to students who have taken a matching semester of 57, 58.) 6 s.h. (E & W) *Anderson, Budd, Duffey, Gerber, and Jones*

141. *Chaucer. The Canterbury Tales* and the minor poems, with attention to their literary and social background. 3 s.h. (W) *van Kluyve*

142. *English Literature of the Middle Ages.* A study of the principal forms and examples of English prose, poetry, and drama of the Anglo-Saxon and Middle English periods (excluding Chaucer), read in translation. 3 s.h.

143, 144. *English Literature: Elizabethan and Seventeenth Century.* A study of the poetry, prose, and drama of the period. First semester: the emphasis in poetry is on Wyatt, Sidney, Spenser, Raleigh, Shakespeare; in prose, on Sidney and Florio's Montaigne; in drama, on Marlowe. Second semester: the chief emphasis is on the metaphysical poets—Donne through Vaughan. Prose: Bacon, Burton, Donne, Browne. Drama: Jonson, Webster, Ford. 6 s.h. (E) *Blackburn*

147. *The Literary Expression of Scientific Thought.* Readings which delineate man's changing concept of nature, with emphasis on both the scientific thought and the literary merit of each text. Representative works of Hesiod, Plato, Aristotle, Lucretius, Descartes, Thomas Browne, Bertrand Russell, and others. Primarily for engineering students and majors in science. 3 s.h. (W) *Heninger*

148. *Satire.* An exploration of the nature and art of literary satire, based on examples, mostly English and American, of various forms and kinds; character-sketch, dialogue of the dead, fable, verse-narrative, eulogy, drama, novel, etc. Prerequisite: English 55, 56. s.h. (E) *Boyce*

150. *Oral Interpretation of Literature.* See under "Speech and Drama."

153, 154. *Readings in European Literature.* Significant works are read in translation and related to similar works in English literature. The first semester includes selected writings of Homer, the Greek dramatists, Plato,

Virgil, and Ovid. The second semester comprises works by Dante, More, Cervantes, Molière, Voltaire, Goethe, Dostoevski, Ibsen, and Kafka. 6 s.h. (w) *Heninger, Krueger, and Randall*

155. *Modern European Drama.* Continental and Irish plays from Ibsen to Brecht are read in relation to the modern drama of ideas and to the free theater movement. 3 s.h. (E) *Reardon*

156. *Modern English and American Drama.* Plays from Pinero to Arthur Miller are read and discussed in relation to European origins and to the contemporary scene. 3 s.h. (E) *Reardon*

159. *Readings in Scandinavian Literature.* A study of selections in translation from Ibsen, Strindberg, Lagerkvist, and others; their place in the literary tradition of Scandinavia and their relationships with English and American literature. 3 s.h. (w) *Anderson*

161. *Development of the English Language.* An elementary historical study of the English language: patterns of change and growth, with some attention to methods of philological inquiry and the relations of philology to literary studies. 3 s.h. (E)

162. *Modern English Grammar.* A descriptive study of written and spoken American English of the present time, with attention to standards of usage and pronunciation and the relations of grammar to composition. 3 s.h. (E) *van Kluyve*

165, 166. *American Fiction.* A survey of the novel and the short story. The first semester covers the nineteenth century, from Washington Irving to Stephen Crane; the second covers the twentieth century through ten representative books. 6 s.h. (w) *Anderson and Budd*

167, 168. *The European Epic Tradition.* The development of the Epic tradition seen through detailed analysis of the major texts and major themes: Homer, Vergil, *Beowulf*, Dante, Cervantes, Milton, Tolstoy, Joyce. Prerequisite for 168: 167. 6 s.h. (w) *Knight*

181. *Conference on Drama.* A seminar primarily for majors, with priority given to seniors. Emphasis on literary theory and critical writing, with intensive study of one or more authors. 3-6 s.h. (E)

182. *Conference on Poetry.* A seminar primarily for majors, with priority given to seniors. Emphasis on literary theory and critical writing, with intensive study of one or more authors. 3-6 s.h. (E)

183. *Conference on Fiction.* A seminar primarily for majors, with priority given to seniors. Emphasis on literary theory and critical writing, with intensive study of one or more authors. 3-6 s.h. (E)

184. *Conference on Prose Non-Fiction or a Special Topic.* A seminar primarily for majors, with priority given to seniors. Emphasis on literary theory and critical writing, with intensive study of one or more authors. 3-6 s.h. (E)

185. *The Agrarian Spirit.* An interdisciplinary analysis of American history and literature, combining two ways of understanding the response

to the wilderness, pre-urban individualism, agrarian democracy, and the modern reaction against industrialism. (Same as History 185.) 3 s.h. *Budd and Scott*

186. *The Industrial Spirit.* An interdisciplinary analysis of American history and literature combining two ways of understanding the rise of the city, modern industry, science and technology, corporate thinking, and the mass media. (Same as History 186.) 3 s.h. *Budd and Scott*

191, 192. *Independent Study.* Directed reading and research. Open only to highly qualified students by permission of the Department. See p. 56. 6 s.h.

197-198. *Senior Seminar in English.* A course designed to offer guidance in the analysis and interpretation of English and American literature to students of superior ability. Comparative studies will be encouraged, and considerable reading will be required in critical and aesthetic theory. Emphasis will be placed upon the final essay. Admission by invitation of the Department. 6 s.h. (E & W) *Blackburn, Patton, and van Kluyve*

For Seniors and Graduates

203. *Chaucer.* The minor poems, *Troilus*, and *The Canterbury Tales*. 3 s.h. (W) *Nygard*

207. *Old English Grammar and Readings.* 3 s.h. (W) *Nygard*

208. *History of the English Language.* A survey of the language from Old to Present English, taking into consideration developments in phonology, morphology, syntax, and vocabulary. 3 s.h. (W) *Nygard*

209. *Present-Day English.* A description of present-day American English from the point of view of modern linguistic theory; comparison of traditional and structural grammars; semantic change; the relation of the written to the spoken language; usage. 3 s.h. (W) *Nygard*

213. *Introduction to Folklore.* A survey of the materials of popular tradition, the folksong, the folktale, the proverb, the riddle, and other forms; the methods of folklore investigation; and the relation of these popular genres to literary tradition. 3 s.h. (W) *Nygard*

215, 216. *Elizabethan Drama.* Study of one or two major dramatists (Jonson or Beaumont and Fletcher) and extensive reading in other writers (Heywood, Ford, Massinger, Marlowe, Middleton) with emphasis on the nature and qualities of their work in relation to its historical background. 6 s.h. (W) *Lievsay and Randall*

217. *Milton.* Milton's poetry and prose, with emphasis on the major poems. 3 s.h. (W) *Lievsay*

218. *Spenser.* The reading of Spenser's works, with chief attention to *The Faerie Queene*. 3 s.h. (W) *Heninger*

219, 220. *The Eighteenth Century.* Swift, Pope, Defoe, Addison, Steele, and others are studied in the first semester; in the second, Gray, Johnson,

Boswell, Collins, Goldsmith, the novelists and other writers. 6 s.h. (w) *Boyce and Ferguson*

221, 222. *English Literature of the Early Nineteenth Century.* The Romantic poets and prose writers from Scott to the early Carlyle, with special attention to Wordsworth, Coleridge, and Keats. 6 s.h. (w) *Patton, Sanders, and Stevenson*

223, 224. *English Literature of the Later Nineteenth Century.* The first semester is devoted chiefly to Carlyle, Dickens, Thackeray, Tennyson, and Browning; the second semester to Arnold, Ruskin, Pater, George Eliot, Meredith, the Pre-Raphaelites, and Swinburne. 6 s.h. (w) *Sanders and Stevenson*

227. *Literary Criticism.* Readings from the major critics, Plato to the present, with emphasis on formative ideas and historical continuity. 3 s.h. (w) *Lievsay*

229, 230. *American Literature, 1800-1865.* The writers emphasized in the first semester are Emerson, Thoreau, and Hawthorne; in the second semester, Poe and Melville. 6 s.h. (w) *Budd and Turner*

233, 234. *American Literature, 1865-1920.* Selected works of representative authors of the period. The first semester's assignments will include Whitman, Lanier, Mark Twain, James, Howells, Emily Dickinson, Henry Adams, and the Local Colorists; the second semester's Crane, Norris, Moody, London, Dreiser, Edith Wharton, Willa Cather, O'Neill, Robinson, and Frost. The lectures will deal primarily with literary trends as shaped by the social background. 6 s.h. (w) *Gohdes*

235, 236. *American Literature Since 1920.* First semester, selected fiction from Gertrude Stein to the present. Second semester, poetry from the Imagist movement to the present. 6 s.h. (w) *Duffey*

237. *English Drama, 1642-1800.* The heroic play and the comedy of manners of the Restoration; the important plays, serious and comic, of the eighteenth century. 3 s.h. (w) *Ward*

239. *Shakespeare.* The plays and poems. 3 s.h. (w) *Williams*

244. *Literary Biography.* Selected works from Plutarch to Strachey with discussion of the historical development of biography, the various methods it has used, and the various theories which have been held about it. 3 s.h. (w) *Sanders*

251, 252. *English Literature in the Seventeenth Century.* Major works in prose, poetry, and drama from 1600 to the death of Dryden. 6 s.h. (w) *Ward*

261, 262. *English Literature of the Twentieth Century.* Representative work of leading writers from 1900 to 1950, in fiction, drama, and poetry. The first semester will include Shaw, Conrad, Yeats, Wells, Bennett, Galsworthy, Ford, Synge, Forster, and Lawrence; the second semester, Joyce, Woolf, Edith Sitwell, Eliot, Huxley, Graves, Bowen, Auden, and Dylan

Thomas. Critical analysis of selected texts, with discussion of techniques and ideas. 6 s.h. (w) *Smith*

264. *Major Developments in Contemporary American Poetry.* The principal contributions to modern poetry made by American poets, including imagism and the new poetry; Eliot, Stevens, Hart Crane, the "Fugitives," and a selection from the poets of the present generation. 3 s.h. (w)

266. *Recent Critical Thought.* Questions of the nature and value of literature as reflected in recent criticism, theoretical and practical. 3 s.h. *Duffey*

269, 270. *Southern Literature.* The principal authors and the chief literary developments from the beginnings to the present. Emphasis in the first semester is on Byrd, Kennedy, Simms, Poe, Timrod, and the humorists; in the second on Lanier, Harris, Cable, Mark Twain, Ellen Glasgow, and Faulkner. Attention is given to the historical and cultural background and to literary relations extending outside the region. 6 s.h. (w) *Turner*

277. *English Prose of the Sixteenth Century.* Readings in the major forms and authors. 3 s.h. (w) *Lievsay*

278. *English Non-Dramatic Poetry of the Sixteenth Century.* Extensive select readings from representative types and authors, excluding Spenser. 3 s.h. (w) *Heninger and Lievsay*

Departmental Major

Prerequisite. English 55-56.

Major Requirements. Twenty-four semester hours above the sophomore level in writing, speech, drama, literature, and language; at least eighteen hours must be in English and American literature meeting the following requirements of distribution:

1. Six hours at the junior-senior level (generally to be taken in the junior year) in one of five designated period courses (143-144, 111-112, 125-126, 131-132, 137-138).
2. Three hours in one of the major authors: Chaucer, Shakespeare, or Milton (141, 203, 123, 124, 239, 117, 217).
3. The remaining hours must meet the following distribution requirements:
 - (a) Three hours of English literature before 1800 (excluding major authors), unless the requirement is met in (1) above.
 - (b) Three hours of English literature after 1800, unless the requirement is met in (1) above.
 - (c) Three hours of American literature, unless the requirement is met in (1) above.

Related Work. Eighteen semester hours, which may include appropriate courses in history, aesthetics, art, music, foreign languages and literature, literature in translation, philosophy, religion, linguistics, and the teaching of English. Related work must be taken in at least two departments.

The Department offers work leading to graduation with distinction. See the section on Honors in this *Bulletin*.

Forestry

Students without a Bachelor's degree who are preparing for work in forestry as a profession should take the courses outlined under the Academic-Forestry Combination outlined in the section on Requirements for Degrees. However, with the consent of the instructor in charge, certain forestry courses may be elected by students in other curricula provided they have had adequate preparation (see *Bulletin of the School of Forestry*).

Members of the sophomore, junior, and senior classes, whether or not registered in the Forestry Combination Program, may elect the following course:

52. Principles of Forestry. Introduction to forestry in the United States; growth of trees and forests; social and economic problems in developing America's primary renewable natural resource; contribution of forests to the national economy. 2 s.h. (w) White

French

For courses offered in French, see *Romance Languages*, p. 165.

Geology

Professor Berry, *Chairman*; Assistant Professor Furbish, *Director of Undergraduate Studies*; Associate Professor Heron; and Assistant Professors Lynts and Pilkey

All students who wish to take a B.S. degree in Geology must take an approved summer field course. This normally is taken during the summer of the junior year.

51. General Geology. This course is designed to give a general view of the surface features of the earth, their origin, structure and materials. Illustrative materials are studied in the laboratory. Excursions are made to

neighboring points where the principles of the science are studied in the field. Three one-hour lectures or recitations and one three-hour laboratory. 4 s.h. (E) *Heron and Staff*

52. General Geology. This course is designed to give some knowledge of the chief events of the earth's history. Excursions will be made to suitable neighboring localities. Three one-hour lectures or recitations and one three-hour laboratory. Prerequisite: Geology 51. 4 s.h. (E) *Heron and Staff*

57. Geomorphology. A detailed study of the processes at work on the land surface and the topographic forms produced by them under different climatic conditions. This course includes practice in the interpretation of topographic maps. Three one-hour lectures or recitations and one three-hour laboratory. 4 s.h. (E) *Berry*

103. Fundamentals of Mineralogy. Principles of crystallography, crystal chemistry, crystal physics and minerals identification. Excursions will be made to neighboring mineral localities. Three one-hour lectures or recitations and one three-hour laboratory. Prerequisite: Chemistry 1, 2 or 2 only (may be taken concurrently). 4 s.h. (E) *Furbish*

106. Igneous and Metamorphic Rocks. Silicate mineralogy, theory of origin and classification of igneous and metamorphic rocks and rock identification. Two one-hour lectures or recitations and one three-hour laboratory. Prerequisite: Geology 103. 3 s.h. (E) *Furbish*

108. Sedimentary Rocks. Authigenic and detrital minerals, theory of origin and classification of sedimentary rocks and rock identification. One one-hour lecture or recitation and one three-hour laboratory. Prerequisite: Geology 51. 2 s.h. (E) *Heron*

143. Principles of Stratigraphy. Theory of correlation, sedimentation and stratigraphic units. Three one-hour lectures or recitation. Prerequisite: Geology 52. 3 s.h. (E) *Staff*

151. Economic Geology. Study of world distribution, geologic occurrence and uses of important mineral deposits. Three one-hour lectures or recitations and one three-hour laboratory. Prerequisite: Geology 103. 4 s.h. (E) *Berry*

152. Introductory Paleontology. Systematic study of invertebrate paleontology, dealing mainly with generic characters of the fossil invertebrates and their use in identifying and correlating geologic formations. Three one-hour lectures or recitations and one three-hour laboratory. Prerequisite: Geology 51, 52. 4 s.h. (E) *Berry*

164. Introduction to Geologic Field Methods. Principles and techniques used in geologic mapping and field studies including applicable methods of surveying and the use of aerial photographs. Field excursions will be made when possible. Two hours of lectures and three hours of laboratory each week. Prerequisites: Geology 51 and 52. 3 s.h. (E) *Furbish*

166. Structure. Structural features of the earth's crust. Three one-hour lectures or recitations. Prerequisites: Geology 106, 143. 3 s.h. (E) *Staff*

175, 176. Majors Seminar. Review of current literature in selected fields of geology. Required of all majors; 175 in the spring of the Junior year; 176 in the spring of the Senior year. One hour per week. 2 s.h. (E) *Staff*

191, 192. Independent Study. Directed reading and research. Open only to highly qualified students in the junior year, by permission of the Director of Undergraduate Studies. (See page 56.) 6 s.h.

For Seniors and Graduates

203. Advanced Stratigraphy. A survey of the Phanerozoic deposits of the world with special emphasis on type areas. 3 s.h. (E) *Staff*

205. Marine Geology. The study of the broad geologic aspects of the ocean basins, including origin, bottom physiography, sediment distribution and sedimentary processes. Observations in the field will be emphasized and will include training in sampling procedures for both shallow and deep water. This course is not open to students who have completed Geology 206. 6 s.h. *Pilkey* (Given at Beaufort only.)

206. Geological Oceanography. A survey of geological aspects of the oceans including sediment types, processes of sedimentation, geologic structures of the ocean basins, and bottom physiography. 3 s.h. (E) *Pilkey*

207. Sedimentary Petrography. Systematic description and classification of sedimentary rocks. 3 s.h. *Heron*

222. Sedimentary Minerals. Major detrital and authigenic minerals with emphasis on the clay minerals. 3 s.h. (E) *Heron*

235. Sedimentary Geochemistry. A survey course of the broader aspects of marine geochemistry and the geochemistry of ancient and recent sediments. Also included is a review and general summary of inorganic chemical principles important to the control of geochemical processes. 3 s.h. (E) *Pilkey*

Departmental Major

Prerequisites. Chemistry 1, 2, Geology 51, and 52.

Major Requirements. A.B. degree, a minimum of 24 hours of geology above the elementary courses (51, 52). B.S. degree, a minimum of 24 hours of geology above the elementary courses (51, 52) plus a summer field course.

Related Work. Number of hours needed for A.B., 12 s.h.; for B.S., 18 s.h. Required courses, Mathematics 21, 22. Departments in which related work is usually taken, chemistry, mathematics, physics, zoology, and engineering.

Germanic Languages and Literature

Professor Salinger, *Chairman*; Visiting Professor Kunstmann; Associate Professor Seymour, *Director of Undergraduate Studies*; Visiting Associate Professor Bruhn, *Supervisor of Freshman Instruction*; Associate Professors Maxwell and Phelps; Instructors Arndt, Bessent, Klages, Trump, and Wahle

1-2. Elementary German. Practice in understanding, speaking, reading, and writing. Classroom techniques are combined with those of the language laboratory. 8 s.h. (E & W) *Bruhn and Staff*

63-64. Intermediate German. Prerequisite: German 1-2 or equivalent. 6 s.h. (E & W) *Phelps and Staff*

German 63-64 is prerequisite for 91, 92 and all 100 group courses.

91, 92. Introduction to German Literature. A third-year course, completing the language requirement. Reading from representative German authors. 4 s.h. *Bessent*

107, 108. Scientific German. The German language as used in the various contemporary sciences. 4 s.h.

109, 110. German Prose Fiction. Origin and development of the German novel and short story with special emphasis on the nineteenth century. 4 s.h. *Phelps*

115, 116. German Drama of the Nineteenth Century. A study of leading dramatists from Kleist to Hauptmann. 4 s.h. *Seymour*

117, 118. German Conversation. A course in writing and speaking German, restricted to German majors and other students by permission of the Department. 6 s.h. *Bessent*

119, 120. Survey of German Literature. German literature and its cultural background. First semester: From the beginnings to the romantic period. Second semester: From romanticism to the present. Lectures, reports, and readings. 6 s.h. *Phelps*

125, 126. Contemporary German Literature. A study of representative works of the twentieth century. 4 s.h. *Phelps*

131, 132. Introduction to Goethe. The reading of his early novels, dramas, and epics and works pertaining to his life. 4 s.h. *Salinger*

133, 134. The German Lyric. A survey of the development of German lyric poetry, principally from Klopstock to Rilke (with some attention to mediaeval and early modern poets), seen as poetic reflection of German thought. 4 s.h. *Salinger*

171, 172. German Literature in English Translation. The great epochs in German Literature studied through English translations of representative masterpieces. 6 s.h.

191, 192. Independent Study. Directed reading and research. Open

only to qualified students in the junior year, by permission of the Department. See p. 56. 6 s.h. *Phelps, Salinger, and Seymour*

193, 194. *Independent Study.* Directed reading and research. Open only to qualified students in the senior year, by permission of the Department. 6 s.h. *Phelps, Salinger, and Seymour*

201, 202. *Goethe.* A study of his life and works in the light of his lasting significance to world literature. 6 s.h. *Salinger*

203, 204. *Eighteenth Century.* Eighteenth-century German literature in its relation to contemporary European philosophy. 6 s.h. *Phelps*

205, 206. *Middle High German.* The language and literature of Germany's first classical period. 6 s.h. *Seymour*

207, 208. *German Romanticism.* The course covers the entire field of German romanticism from 1800. 6 s.h.

209, 210. *Kleist, Grillparzer, and Hebbel.* The development of the drama in Germany and Austria between Schiller and Naturalism. 6 s.h. *Salinger*

211, 212. *Heinrich Heine and His Time.* Heine's life and thought, and the contemporary European culture. 6 s.h. *Salinger*

213. *Nineteenth-Century Literature.* From the end of Romanticism through Realism. Readings from Mörike, Büchner, Hebbel, Stifter, Keller, Meyer, Storm, and Fontane. 3 s.h.

214. *The Twentieth Century.* From Naturalism to the present, with emphasis on Hauptmann, Hofmannsthal, George, Rilke, Mann, Kafka, Hesse, Broch, Musil, Brecht, and Benn. 3 s.h.

215. *Seventeenth-Century Literature.* A study of the leading writers of the Baroque, seen against the background of their time. 3 s.h. *Bruhn*

216. *History of the German Language.* The development of the phonology, morphology and syntax of German from earliest beginnings to the present. 3 s.h. *Seymour*

217. *Sixteenth-Century Literature.* The period of the Reformation with particular emphasis on the personality and works of Martin Luther and his influence on German literature and culture. 3 s.h. *Kunstmann*

218. *The Teaching of German.* Critical survey of modern teaching techniques; intensive practice in solving problems encountered in the teaching of German on the secondary and college levels. Analysis and evaluation of textbooks and related audio-visual materials with special emphasis on the utilization of the language laboratory. 3 s.h. *Bruhn*

230. *German Cultural History.* A study of the backgrounds of German civilization and culture (*Kulturkunde*) in varying aspects and impacts from earliest times down to the most recent. 3 s.h.

Departmental Major

Prerequisites. German 1-2 and 63-64, or equivalent.

Major Requirements. Twenty-four semester hours in the German Department. Nine of these must be selected from the 200 courses. The remaining fifteen may be selected from any courses in the 100 or 200 groups. German 107, 108 does not count toward the major. German 117, 118, and 119, 120 (as well as Linguistics 101) are highly recommended to any student majoring in the Department.

Related Work. Eighteen semester hours, chosen from the Humanities with the approval of the Germanic Languages Department.

Health and Physical Education

Trinity College and the College of Engineering

Mr. Cameron, *Director*; Professor Friedrich, *Chairman of Physical Education and Assistant Director of Physical Education*; Professor Falcone; Associate Professors Bly, Cox, Harrison, and Persons; Assistant Professors Buehler, Corrie, Davis, Hall, LeBar, Skinner; Instructors Hagler, Harvey, Lutz, Daly, and McElhaney

Required Physical Education for Men

A student must complete four semesters of physical education to fulfill graduation requirements. For each semester of undergraduate enrollment, the student is issued a uniform appropriate for the season and the activity in which he is engaging. The uniform is issued, exchanged, laundered, and maintained at no additional expense to the student. Students who cannot swim are required to learn how during the Freshman year.

All students are given a medical and physical examination before registration. Students who have physical handicaps must register in Adapted Physical Education—P.E. 11 and P.E. 12. Students assigned to these classes will take work adapted to their particular needs and capacities.

Physical Education 1. Students not assigned to adapted physical education will register in P.E. 1—Foundations of Physical Education. The fall program for freshmen has been specifically designed to provide the student with a broader concept of the “how” and “why” of physical activity. It includes an extensive battery of tests and involves information and activities related to interpretations of health and fitness, training techniques, relaxation techniques, weight control, body mechanics and posture control. Students are given an opportunity to become acquainted with various sports activities, including swimming, wrestling, and team games. Emphasis is given to the development of fitness.

On the basis of the test results and other factors such as body type,

students are guided into those areas which can best help them develop their physical potential and provide for their future needs.

During the second semester students will be involved in activities best suited for them. These activities include: Combatives, Gymnastics, Swimming, Track and Field, and Individual Development.

After a student has completed Freshman Physical Education, he may complete his physical education requirement by electing and satisfactorily completing two courses from the following individual and team sports: P.E. 36—Beginning and Intermediate Swimming; P.E. 46—Advanced Swimming and Aquatic Activities; P.E. 51—Tumbling, Rebound Tumbling and Apparatus; P.E. 52—Badminton-Handball; P.E. 53—Basketball-Speedball; P.E. 54—Combatives and Track and Field; P.E. 56—Life Saving and Water Safety; P.E. 57—Tennis-Volleyball; P.E. 58—Golf (A fee of \$10.00 for the semester, payable at the Treasurer's Office, is charged for course 58—Golf); P.E. 61 and 62—Sophomore adapted P.E. is offered for those students who are assigned to this course by the health center. P.E. 63—Individual Development. This course which is open to all students includes conditioning, posture, weight control, fundamental movements, and weight training. P.E. 64—Fencing. P.E. 70—Bowling and Square Dancing.

Elective Professional Physical Education Courses (Men)

The courses listed below are arranged to meet the increasing demand for teachers who are qualified to coach and teach Physical Education as well as for those who may have leadership responsibilities in the area of recreation. These courses are open as electives for students in High School Teaching Programs and others for whom such courses may be appropriate. Teaching majors may elect 18 semester hours from courses in this group. Six semester hours may be elected from the courses listed under Special Methods in Physical Education, 9 semester hours from the courses listed under Theory and Practice in Physical Education, and 3 semester hours from Health Education. The courses should be selected with the advice of the Director of Undergraduate Studies from the student's major department, in order to meet the needs of the individual.

Special Methods in Physical Education

163. *Athletic Coaching in Secondary Schools.* Theory and practice in the fundamentals of coaching baseball and track. Prerequisites: courses 1 and 2. Open to juniors and seniors. Sophomores by permission only. 3 s.h. (w) *Buehler and Parker*

164. *Athletic Coaching in Secondary Schools.* Theory and practice in

the fundamentals of coaching football and basketball. Prerequisites: courses 1 and 2. Open to juniors and seniors. Sophomores by permission only. 3 s.h. (w) *Falcone and Daly*

Theory and Practice in Physical Education

65. *History and Principles of Physical Education.* A study of the objectives and scientific principles upon which physical education is based. The history of physical education is studied in order to show the changes in objectives, principles, and methods and as an aid in the interpretation of trends. Open to sophomores, juniors, and seniors. 3 s.h. (w) *Friedrich*

66. *Recreational Leadership.* Theories and philosophies of play and recreation with emphasis on leadership and application to community, school and family situations. 3 s.h. (w) *Friedrich*

182. *The Administration of Physical Education and Athletics in Secondary Schools.* A case study appraisal of athletic health and physical education problems experienced in the organization and administration of athletics health and physical education. 3 s.h. (w) *Corrie*

190. *Protective Practices in Physical Education.* A study of safety unprotective measures, including training and first aid. Open to juniors and seniors. 3 s.h. (w) *Davis*

Health Education

132. *School Health Problems.* A course designed (a) to familiarize the teacher with school health problems such as physical screening, communicable disease prevention and control, healthful school environment; (b) to present methods and materials for health teaching in elementary and secondary schools. 3 s.h. (w) *Friedrich*

Woman's College

Professor McCue, *Chairman*; Professor Lewis, *Director of Undergraduate Studies*; Associate Professor Eddy, *Supervisor of Freshman Instruction*; Professor Bookhout; Associate Professors Holton and Uhrhane; Assistant Professors Lloyd, Spangler, Woodyard, and Wray; Instructor Raynor

A student must complete four semester hours of physical education in order to fulfill graduation requirements. Ordinarily work must be completed by the end of the sophomore year. Classes meet three times a week or the equivalent thereof. Gym suit, dance leotard, bathing suit, warm-up suit, and towel are provided and laundered as needed.

Each semester is divided into halves. In general, indoor activities are

taught during the two winter half-semester and outdoor activities in the fall and spring.

Every student must take one course (half-semester) in dance and one in swimming if she is unable to pass the swimming test. The remaining work necessary to complete the requirement may be elected from the activities listed in this section.

All students are given a physical and medical examination upon entering and at any other time when deemed necessary. Classes in adapted physical education and recreational sports are arranged for those who should not take the more active work.

Special Freshman Physical Education

At the beginning of the year, after a series of tests has been given, each freshman is registered for the course she most needs, as determined by the test scores. Courses in sports fundamentals, beginning swimming, and posture and movement are offered for those who need to improve their skills in these areas. Students whose test scores are satisfactory will enroll in classes with the sophomores.

Physical Education Activities

Individual and dual sports: archery, badminton, bowling, diving, fencing, golf, life saving, recreational sports, riding, stunts, tumbling, and apparatus, swimming, tennis, first aid, life saving, water safety, track and field.

Team sports: basketball, hockey, softball, volleyball, "rec" ball, speedball.

Dance: folk dance, modern dance, square dance, tap dance.

Developmental Activities: posture and movement, posture, sports fundamentals, and conditioning exercises.

The courses listed in this section are open for credit as follows: P.E. 91, 101, 117, 119, 120, 181-182, and 185, Health Education 101-102 open only to students preparing to teach physical education, with the exception of 91 which is open for credit to students in the Elementary Teaching Program. Physical Education 105, 106, 113, 114, and 130 and Health Education 134, 137, 138, and 140, are open to all undergraduate students, both men and women.

91. *First Aid and Safety in Physical Education.* A study of measures which must be taken to insure maximum safety in physical education programs; principles and practices in the care and prevention of athletic injuries. 1 s.h. (E) Lloyd

101. *History and Principles of Physical Education.* A survey of the relationship between physical education and social, political, and religious

ideals of different nations and periods. Principles upon which physical education is based. A study of the physical, emotional, and social development of children at different ages with implications for physical education. Analysis of successful teaching. 3 s.h. (E) *McCue*

102. *The Teaching of Physical Education in Elementary Schools.* A study of methods and materials for teaching physical education to children. Discussion of principles of physical education and practice in teaching elementary school activities. Required of students in the elementary school teaching program. 2 s.h. (E) *Lewis*

105, 106. *Methods and Materials in Recreation.* A course to develop leadership in recreational activities. Recommended for students interested in camping, scouting, Peace Corps and Operation Breakthrough. Laboratory work includes experience with a recreational group in a city organization. Areas covered: Games, Social Activities, Folk and Square Dancing, Crafts, Drama, Song Leading and Story Telling. Open to sophomores, juniors, and seniors. 3 s.h. each (E) *Holton*

113. *Mammalian Anatomy.* A study of all organ systems with special emphasis on osteology, arthrology and mycology. The cat is used as laboratory animal, but constant application is made to man. Not open to students who have had Zoology 53. Prerequisite: Biology 1 and 2. 4 s.h. (E) *Bookhout*

114. *Kinesiology.* A study of muscle function. Analysis of fundamental movements with emphasis on the development of normal posture and efficient body movement. Required of students taking the major in physical education. Prerequisites: Biology 1 and 2, and P.E. 113 or Zoology 53. 3 s.h. (E) *Bookhout*

117. *Physical Fitness and Individual Physical Education.* An analysis of exercises designed to improve physical fitness of groups and to meet individual needs for which specific exercises are indicated. Theory of teaching individual and group gymnastics. 2 s.h. (E) *Bookhout*

119. *Organization and Administration of Physical Education.* Curriculum building in physical education. The administration of class and intramural programs. Administrative problems such as budget, equipment, facilities, interschool athletics, legal aspects, and public relations. 2 s.h. (E) *McCue*

120. *Evaluation and Measurement in Physical Education.* History of evaluation and measurement in physical education. Elementary statistics and application of statistical procedure in testing. Familiarity with athletic achievement tests for elementary and secondary schools, and with testing of sport techniques, rhythm, and general qualities of motor ability, motor capacity, and motor educability. 2 s.h. *Bookhout*

130. *History of the Dance.* A survey of dance through the ages with emphasis on study of form, structure and content of this creative art as it relates to the culture of each era. 3 s.h. (E) *Wray*

181-182. *Methods and Materials in Physical Education.* Includes basic theory and practice in teaching various types of dance, games, and sports. Laboratory hours are arranged to provide practice on the field and in the gymnasium. 6 s.h. (E) *Lewis and Staff*

185. *Advanced Methods and Materials in Physical Education.* A continuation of 181-182. Required of senior majors in physical education. 3 s.h. (E) *Lewis and Staff*.

Health Education

101-102. *Health Education Fundamentals, Methods, and Materials.* Designed specifically for and open only to physical education majors. Basic studies in personal and community health; administration; curriculum and program planning; health services and health counseling; selection, purchase, and care of equipment; library sources; methods and materials for effective health teaching; evaluation techniques and procedures. 6 s.h. (E) *Uhrhane*

134. *School Health.* Organization and administration of the school health program; basic health problems in schools; methods and materials for teaching health education. Primarily designed for students preparing to teach in elementary and secondary schools and for physical education majors. Open to men and women. 2 s.h. (E) *Uhrhane*

137. *Health Problems of Developing Countries.* Study of health problems which are interrelated with economics, productivity, and progress of emerging nations. Concentrated study of several selected countries will be used to exemplify the problems and possibilities. Open to men and women. 3 s.h. (E) *Uhrhane*

138. *Health Problems of Metropolitan Areas.* Housing and city planning, water resources, waste disposal, air pollution, radiation, food distribution, and mobility and migration. Open to men and women. 3 s.h. (E) *Uhrhane*

140. *Gereology and Health.* Designed to help the college age person understand and appreciate the health problems of aging. Topics to be considered will include: emotional health implications in the changing role of the aged in our society; housing plans, nursing homes and medical care; health problems related to the degenerative diseases, accident hazards; nutrition; and health implications of retirement and leisure time activities. Open to men and women. 3 s.h. (E) *Uhrhane*

Requirements for Teaching Physical Education and Health in Public Schools

The following requirements have been set up for students in the Teaching Program who wish to qualify as full-time teachers of Physical Educa-

tion and Health. The requirements meet the standards of the North Carolina Department of Public Instruction for certification in Physical Education and Health and of many of the other states represented in the student body. Students preparing to teach in any state are advised to consult the Department of Education about specific requirements.

Prerequisites. Physical Education 101. Biology 1-2.

Major Requirements. 23 s.h. including Physical Education 91, 113, 114, 117, 119, 120, 181-182, 185.

Related Work. Sufficient work in subjects required for certification for teaching Physical Education and Health. Of these, 6 hours must be in Health Education 101-102 and 4 hours in Zoology 151, Principles of Physiology. For the remaining hours work done in the Department of Education leading to teacher certification is acceptable. Courses in health education, chemistry, zoology, sociology, psychology, art, music, and physical education are recommended.

Hindi-Urdu

171, 172. *Modern Indian Literature.* Readings in English of the major writings of the Nineteenth and Twentieth centuries. First semester: major emphasis on the impact of English and other literatures on Bengali, Hindi, etc., writing to the 19th and early 20th centuries. Second semester: recent and current trends. 6 s.h. *Swan*

181, 182. *Intensive Elementary Hindi-Urdu.* Four hours of classroom work, two hours of language drill. Concentration on the acquisition of conversational ability in Hindi-Urdu, with a grammar and vocabulary basic to both Hindi and Urdu. Introduction to the Devanagari script, and the reading of graded texts. 8 s.h. *Swan*

183, 184. *Intensive Intermediate Hindi-Urdu.* Four hours of classroom work, two hours of language drill. Advanced conversation in Hindi-Urdu Reading and Composition. Introduction to the Nastaliq script. (Prerequisite: Elementary Hindi-Urdu.) 8 s.h. *Apte*

Hindi 185, 186. *Advanced Hindi Reading and Composition.* An introduction to scholarly and literary Hindi prose, and extensive practice in composition. Prerequisite: Hindi-Urdu 183, 184, or equivalent. 6 s.h. *Swan or Staff*

200, 201. *Special Studies in South Asian Languages.* Intensive concentration in advanced Hindi reading and conversation, or specialized, graded work in cognate South Asian languages necessary for the advanced student contemplating field work in South Asia. Prerequisite: Consent of instructor. 6 s.h. *Swan and Staff*

These courses are offered as an enrichment program for students inter-

ested in the South Asian subcontinent and may be taken as general electives by advanced undergraduate students. No major work is offered in Hindi-Urdu.

History

Professor Watson, *Chairman*; Professor Colton, *Director of Undergraduate Studies*; Associate Professor Young, *Supervisor of Freshman Instruction*; Professors Alden, Crane, Curtiss, Durden, Ferguson, Hamilton, Holley, Lanning, Parker, Preston, Ropp, and Woody; Visiting Associate Professor De; Associate Professors Acomb, Davis, Gillin, Hollyday, Lerner, A. Scott, W. Scott, and Van Aken; Assistant Professors Cell and Ginter; Instructors Krantz, Mauskopf, Pearson, Ryland, Staude, and Wilson

The undergraduate courses in history are designed to afford (1) an introduction to the study of history by a consideration of the history of the modern world; (2) a more intensive study of general American history; (3) opportunities for more advanced study of phases of American, English, European, Hispanic-American, Russian, and Asian history.

Course 1-2 or 51-52 or the equivalent is a prerequisite for all other courses; courses 91 and 92 are prerequisite for all 100 and 200 courses in United States history. However, seniors with written permission from the instructor may take advanced American history courses without having had 91 and 92. Sophomores who took only one semester of course 1-2 in the freshman year may take courses 91, 92, 95, 96 or 99 concurrently with the second semester, provided they made a grade of B or above on the semester taken. Sophomores must obtain permission of the instructor in order to be admitted to courses numbered above 100; students who are not fully qualified sophomores will not be admitted to these courses. Courses for seniors and graduates are limited to twenty-five students; juniors may not elect them without special permission from the Department and the Executive Committee of the Graduate Faculty.

1, 2. **Modern History.** With special reference to the issues in the modern world. Topics selected for emphasis: the contest between liberty and authority in the modern state; changing economic organization and theory—capitalism and the challenges to it; the problems of peace and war among the states; the changing faiths men live and die by. Beginning about 1500 with the rise of the European dynastic states, the story is pursued in the first semester to approximately 1848, and in the second through the two great world wars. The central theme in both semesters is the expansion of the influence of Western Europe throughout the world, with some attention to the rise of the United States as a world power. Sophomores and juniors are not admitted to this course. 6 s.h.

Ferguson, Manchester, and Ropp; Acomb, Gillin, Hollyday, Lerner, and Young; Cell and Ginter; Krantz, Mauskopf, Pearson, Ryland, Staude, and Wilson

43, 44. Freshman Tutorial. Readings and discussions on a tutorial basis offered as an elective to freshmen to supplement History 1, 2. 1 s.h. each semester. *Staude*

51, 52. Modern History. An introductory course for sophomores, juniors, and seniors dealing with the topics indicated in the description of course 1-2. 6 s.h. *Parker, Acomb, Cell, Krantz, Mauskopf, and Staude*

91. The Development of American Democracy to 1865. A study of the trends vital to an understanding of the United States today. The main theme is the development of American democracy. Problems of foreign policy, the growth of capitalism, political practices, social reform, and conflicting ideals are considered in relation to this main theme. 3 s.h. *Durden and Holley; Davis, A. Scott, and Van Aken; Wilson*

92. The Development of American Democracy, 1865 to the Present. A continuation of History 91 with emphasis upon the emergence of contemporary problems. 3 s.h. *Durden and Holley; Davis, A. Scott, and Van Aken; Wilson*

Courses 91 and 92 are intended both to serve as continuation courses in the study of history and to afford the student an opportunity to gain the understanding of the past of the United States essential for intelligent citizenship. These courses are prerequisite for all 100 and 200 courses in United States history, but this prerequisite may be waived for seniors by written permission of the instructor.

93. Modern Technology. An introduction to the history of modern Western technology, with special emphasis on the nineteen and twentieth centuries. Technological development will be related to the political, economic, and scientific trends discussed in History 1, 2. 3 s.h. *Ropp*

95, 96. Ancient and Medieval History. The history of mankind from preliterate man through the development of the characteristic institutions of Western Europe. The first semester considers the prehistoric tribes, the early cultures of Mesopotamia and Egypt, the religious contribution of the Hebrews, and classical Greece and Rome. The second semester deals with Europe in the Middle Ages, from Constantine to Columbus, with emphasis upon institutional and cultural development. 6 s.h. *Young*

99. Naval History and Elementary Strategy. After a review of earlier periods, attention is given to the rise of sea-power and its importance in more recent times and to naval actions, especially in the two World Wars. This course is not open to students who have had N.S. 102. 3 s.h. *Ropp*

101, 102. Introduction to the Civilizations of Southern Asia. (See Inter-disciplinary Course 101, 102.)

103, 104. Renaissance and Reformation. A history of Europe in the age

of the Renaissance and Reformation, with attention to political, cultural, and religious developments. 6 s.h. *Krantz*

105, 106. *Political and Constitutional History of England.* The origins and evolution of the principal institutions of the English government, related to their setting in a changing society. 6 s.h. *Ginter*

107, 108. *Social and Cultural History of England.* English history from the fourteenth century to the present time in an effort to arrive at a synthesis of social and political events and thus provide a background for the study of English literature. Emphasis is placed on the ages of Chaucer, Shakespeare, and Milton; the eighteenth and early nineteenth centuries; the reign of Victoria and the twentieth century. (*Sophomores who made an average grade of B or above on course 1-2 may be admitted to this course.*) 6 s.h. *Ferguson*

109, 110. *History of Rome.* History of the Roman state from its beginnings to the death of Justinian; its expansion; development of its constitution and public administration; social, legal, political and economic problems of perennial life and interest; the background and setting of Christianity's rise and growth. [Listed also in the Classical Studies Department as Latin 131, 132] 6 s.h. *Rogers*

111, 112. *America in the Colonial and Early Modern Era.* Lectures upon the history of America from the discovery to the beginning of the Civil War. They will be primarily concerned with things political, institutional, and social, with occasional discussions of intellectual and cultural advance. 6 s.h. *Alden*

113, 114. *America in the Twentieth Century.* Political, economic, and social problems of twentieth-century United States. Emphasis is placed on reform movements from the Muckrakers through the Fair Deal, the emergence of the United States as a world power, and conflicting ideas and ideologies. 6 s.h. *Watson*

121, 122. *Foreign Relations of the United States, 1775 to the Present.* (first semester to 1898). With emphasis on social and economic currents as well as on diplomacy. 6 s.h. *Davis*

123, 124. *City and Frontier in American History.* The westward movement and the progress of urbanization with attention to the social and political consequences. 6 s.h. *A. Scott*

127. *History of Latin America Through the Formation of the National Governments.* 3 s.h. *Lanning and Van Aken*

128. *Inter-American Affairs.* This course treats the relations of the Latin-American states with each other and with the United States with the design of explaining the current significance of Latin America. Chief emphasis is placed upon social problems and movements common to all the republics and upon the role of the United States in Latin-American affairs. 3 s.h. *Lanning*

131, 132. *The Development of the Major South American Powers.*

Political, social, and economic history of Argentina, Brazil, and Chile since independence. First semester to 1890; second semester to the present day. 6 s.h. *Van Aken*

135, 136. *Europe in the Twentieth Century*. Political, economic, and intellectual developments in Europe since 1900. First semester to 1933; second semester to the present day. 6 s.h. *Colton*

137, 138. *Foreign Relations of the European Powers*. European diplomacy and Europe's position in the world since 1870, with an introductory survey of diplomatic institutions since the Renaissance. 6 s.h. *W. Scott*

139, 140. *Nineteenth-Century Europe*. With special attention to Germany and Austria-Hungary, this course emphasizes the development of European nationalism and the clash of freedom and authority. 6 s.h. *Hollyday*

141, 142. *China and Japan in Modern Times*. A history of their response to the West between 1750 and the present, with some attention to their cultural background. 6 s.h. *Gillin*

147. *The History of India to 1757: A Survey*. The history of the Indian sub-continent; classical Hindu civilization; the coming of Islam; the Mughal Empire; European penetration and rivalries; the establishment of British supremacy. 3 s.h. *Crane*

148. *The History of India, 1757 to the Present: A Survey*. The East India Company; British impact; the Indian Mutiny; the nature and effects of Crown rule; Indian nationalism; Muslim nationalism; the Gandhian Era; the transfer of power; partition and independence; the contemporary scene. 3 s.h. *Crane*

153, 154. *The History of the South*. A study, beginning in the colonial period, of the development of the Southern part of the United States with particular attention to its distinctive characteristics and institutions and to their influence in shaping Southern attitudes toward major questions of national policy. 6 s.h. *Woody*

157, 158. *The Rise of Modern Science*. A historical survey of the development of scientific ideas with attention to cultural and social influences upon science. First semester, from antiquity through Newton; second semester, eighteenth to twentieth centuries. 6 s.h. *Mauskopf*

161, 162. *Russia From Ivan the Terrible to Present Times*. Topics treated include the rise of the Russian state and its relations with Poland and Turkey; the agrarian problem and the rise of industry; the Russian Revolution; the political, agricultural and industrial policies of the Soviet Union; the role of the U.S.S.R. in World War II; postwar policies. 6 s.h. *Curtiss and Lerner*

163, 164. *Reform and Politics in Nineteenth Century America*. First semester: the coming of the Civil War with emphasis on the reform movements of the Jackson era, and anti-slavery crusade and national politics to

1865. Second semester: reform and politics from the Reconstruction era to the Farmers' Revolt of the 1890's. 6 s.h. *Durden*

167, 168. *Modern European Intellectual and Cultural History*. The ideas of great innovators in European thought from the Enlightenment to the present. 6 s.h. *Staude*

185. *The Agrarian Spirit*. An interdisciplinary analysis of American history and literature, combining two ways of understanding the response to the wilderness, pre-urban individualism, agrarian democracy, and the modern reaction against industrialism. (Same as English 185.) 3 s.h. *Budd and A. Scott*

186. *The Industrial Spirit*. An interdisciplinary analysis of American history and literature combining two ways of understanding the rise of the city, modern industry, science and technology, corporate thinking, and the mass media. (Same as English 186.) 3 s.h. *Budd and A. Scott*

199. *The Changing South*. (See Interdisciplinary Course 199.)

For Seniors and Graduates

Students may receive credit for either semester of a hyphenated course at the 200-level without taking the other semester if they obtain written permission from the instructor and either the Director of Undergraduate or the Director of Graduate Studies.

201-202. *The History of Russia, 1801-1917*. The development of the Russian Empire in its political, social, and economic aspects, and the growth of forces leading to its downfall. 6 s.h. *Curtiss*

203-204. *The United States, 1850-1900*. The rise of sectionalism, secession, war-time problems of the Union and Confederacy, political and economic adjustments of Reconstruction, the status of the Negro, the New South, problems of capital and labor, the agrarian revolt, political parties and reform, the Spanish-American War. 6 s.h. *Woody*

205-206. *The United States in the Twentieth Century*. The emergence of the United States as a major power; attention is focused on domestic developments and conflicting theories of expansion and federal power. Emphasis in the first semester is on the progressive era and the first World War; the second semester is devoted to the twenties and to the Franklin Roosevelt administrations. (Not open to students who have had History 113.) 6 s.h. *Watson*

212. *Recent Interpretations of United States History*. A course designed to encourage a critical evaluation of major issues in United States history through examination of recent interpretations of key problems. (Open only to history graduate students and seniors doing practice teaching in one of their final two semesters.) 3 s.h. *Watson*

213-214. *The Old South*. Political thought and party trends from Jefferson to Calhoun; agriculture, slavery, expansion; commerce, manufactur-

ing, transportation; urban life, religion, education; the rise of Southern nationalism. 6 s.h. *Woody*

215-216. *The Diplomatic History of the United States.* A study of the history of American diplomacy, with particular emphasis on those factors, foreign and domestic, which have shaped the foreign policies of the Republic. 6 s.h. *Davis*

223-224. *The Old Regime and the French Revolution, 1661-1815.* A study of social, political, and intellectual revolutions in continental Europe, centering on France and giving special attention to successive interpretations of historical change. 6 s.h. *Miss Acomb*

225. *The Age of the Reformation.* History and thought of European Christianity between 1517 and 1680. 3 s.h. [Listed also in the Department of Religion as Religion 250] *Hillerbrand*

227, 228. *Europe in the Nineteenth Century.* A study, beginning with the career of Napoleon Bonaparte, of the forces and personalities influential in the nineteenth century. Emphasis in the first semester is on the problems of the biographer; in the second, on those of a student of national communities. 6 s.h. *Parker and Hollyday*

229. *Recent Interpretations of Modern European History.* A course designed to develop the ability to appraise critical historical issues through the study and discussion of recent interpretations of key historical problems in modern European history. (Open only to history graduate students and seniors doing practice teaching in one of their final two semesters.) 3 s.h. *Parker*

231-232. *The Hispanic Colonies and Republics in America.* 6 s.h. *Lanning*

233-234. *The Institutional, Cultural, and Social History of Hispanic America.* The first semester deals with the culture, society, and institutions of the Spanish colonies in America and the second semester with those of the Hispanic American republics. 6 s.h. *Lanning*

235, 236. *European Expansion Overseas. (1415-1898).* A course dealing primarily with the processes by which European institutions were carried overseas and modified in a new environment. In the first semester the emphasis is on Portuguese, Dutch, French, and English experience in the Far East and the Americas to 1763. In the second semester, attention is paid to the emergence of independent centers of European culture, as in Brazil, and to the revivals of mercantile imperialism of the new German, French, Italian and British empires of the nineteenth century. 6 s.h. *Manchester*

237-238. *Europe in the Middle Ages, 395-1500.* Attention is given to distinctive attributes of the period, such as feudalism and scholastic learning, and to such formative elements of European civilization as nationalism and the universities. 6 s.h. *Young*

241-242. *Nationalism and Communism in the Far East.* The growth of

nationalism in China and Japan, culminating in Japan's invasion of China and the subsequent rise to power of the Chinese Communists. 6 s.h. *Gillin*

245-246. *War in the Modern World.* The relations between warfare and modern political, economic, and social conditions. Special attention is given to the development of British and American military methods and to the events of the American Civil War and the two World Wars. The work in the first semester deals with Clausewitz's theories of warfare and the period from the introduction of gunpowder to 1871; in the second semester there is a more detailed analysis of recent land, sea, and air warfare. 6 s.h. *Ropp*

247. *The History of Modern India, 1757-1857.* Historiography of the period; the western impact on the sub-continent; the expansion of Company power; the background and nature of the Indian Mutiny; problems in historical analysis and interpretation. 3 s.h. *Crane and De*

248. *The History of Modern India and Pakistan, 1857-1947.* Historiography of the period; Crown rule; social change; modernization and the economy of the sub-continent; development of nationalism; the Gandhian era and Muslim separatism; the transfer of power and partition; problems of independence. 3 s.h. *Crane and De*

249-250. *Social and Intellectual History of the United States.* The interplay of ideas and social practice through the examination of attitudes and institutions in such fields as science and technology, law, learning, and religion. 6 s.h. *Holley*

251-252. *Recent European History.* A history of political and economic developments in Western Europe since 1870. (Not open to students who have had 135, 136.) 6 s.h. *Colton*

259-260. *The Emergence of the New South 1865 to the Present.* Reconstruction, industrialization, and agrarian revolt; changing status of the Negro; the South's role in the reform movements headed by Theodore Roosevelt, Woodrow Wilson, and Franklin D. Roosevelt. 6 s.h. *Durden*

261-262. *Problems in Soviet History.* Studies in the background of the Revolution of 1917 and the history and policies of the Soviet state. 6 s.h. *Lerner*

263-264. *American Colonial History and the Revolution, 1607-1789.* The founding and institutional development of the English colonies; the background, progress, and results of the Revolution. 6 s.h. (w) *Alden*

265-266. *Modern South America.* Political, social, and economic history of the leading South American nations from the mid-nineteenth century to the present. 6 s.h. (w) *Van Aken*

267, 268. *From Medieval to Early Modern England.* The intellectual, social, and political problems of transition to modern England, with special emphasis on the English Renaissance. (Not open to students who have had 107.) 6 s.h. *Ferguson*

269. *British History from 1714 to 1867*. The Glorious Revolution constitutional evolution, political methodology, Industrial Revolution, reforms are among topics considered in context of the relationship of ideas and events. 3 s.h. *Hamilton*

270. *British History from Mid-Nineteenth Century*. Liberals and Conservatives, Irish Home Rule, the empire, wars and economic decline, the welfare state. 3 s.h. *Hamilton*

285. *Origins of Indian Civilization*. A study of the formation of the classical civilization of the Indian sub-continent from the prehistoric Indus Age to the Gupta Period (4th century A.D.). Attention will be given to the development of political, economic, social and religious movements and institutions. 3 s.h. [Listed also in the Department of Religion as Religion 285] *Sullivan*

297. *The British Empire in the Nineteenth Century*. (From 1783). The development of the Empire from the American Revolution to the imperialism that culminated in the South African War. 3 s.h. *Preston*

298. *The Commonwealth in the Twentieth Century*. The origins and evolution of the Commonwealth of Nations and its adjustment in the age of anti-colonialism. 3 s.h. *Preston*

Independent Study

191, 192. *Independent Study*. Directed reading and research. Open only to juniors with a B average in History and in their over-all work. Admission will be subject to approval of the individual instructor and the Department. 6 s.h. *Staff*

193, 194. *Independent Study*. Same as 191, 192, but for seniors. 6 or 12 s.h. *Staff*

Undergraduate Seminars

Prerequisites. History 1, 2 (or 51, 52) and History 91, 92 (except for History 195A-196A) and the consent of the instructor.

The following seminars are designed to offer opportunities for reading and historical investigation in significant problems. Juniors as well as seniors may apply for admission to these courses, and are urged to do so if they expect to be candidates for graduation with distinction in history or if they expect to practice-teach in their senior year. All seminars are open to non-majors as well as to majors.

195A-196A. *The Background of Modern European Civilization*. Topics in intellectual-cultural history of Europe and adjacent areas from the earliest records to 1648. The work aims to develop critical appreciation and maturity of judgment through using primary sources. 6 s.h.

195B-196B. *Seminar in Twentieth-Century Europe*. (Students may not receive credit for this course and 251-252) 6 s.h. (w) Colton

195C-196C. *Problems in American Intellectual History*. (Students may not receive credit for this course and 249-250.) 6 s.h. Holley

195D-196D. *The Progressive Era Through the New Deal*. 6 s.h. Watson

195E-196E. *Seminar in American History Before 1789*. 6 s.h. Alden

195F-196F. *Problems in Nineteenth Century American Reform and Politics*. (Students may not receive credit for this course and 163-164.) 6 s.h. Durden

195G-196G. *Nationalism and Communism in the Far East*. This course will combine general reading and discussion with occasional lectures and specialized research on the events and forces underlying developments in China, Japan, and other Far Eastern areas during the 19th and 20th centuries. 6 s.h. Gillin

195H-196H. *From Rural to Urban Society in the United States*. 6 s.h. A. Scott

195I-196I. *Nationalism and Freedom in Nineteenth Century Europe*. 6 s.h. Hollyday

195J-196J. *The History of International Socialism and Communism*. International Socialist and Communist movements from Utopian Socialism to the present. 6 s.h. Lerner

195K-196K. *European Expansion and Imperialism*. Selected problems in European expansion, concentrating on the age of discovery, the "new imperialism," and the contemporary era of anti-colonialism. 6 s.h. Cell

196.99. *History Honors Pro-Seminar*. Required in the spring semester of juniors selected for the Senior Honors Seminar of the following year. Conferences on selection of research topics and research techniques. 1 s.h. Holley and Parker

197-198. *Senior Honors Seminar*. A course designed to introduce qualified students to advanced methods of historical research and writing and to the appraisal of critical historical issues. Open only to seniors, but not restricted to candidates for degree with distinction. This course, when taken by a history major, would be in addition to the 6 semester hours required in 195-196 seminars or 200-level courses of the History Department. 6 s.h. Holley and Parker

Departmental Major

Prerequisite. The Introductory Course in History (1-2 or 51-52).

Major Requirements. Students desiring to take a major in history are required to elect, in addition to History 1-2 or 51-52, 24 semester hours in the Department, including six semester hours in either an undergraduate seminar (195-196) or any course in the 200 group. Students are urged to

take History 91-92; in any case those wishing to take the more advanced courses in American history should elect History 91-92 in the sophomore or junior year.

Honors. Any student who is qualified (see the section on Honors in this *Bulletin* for general requirements) may undertake work leading to a degree with distinction in History by presenting himself to his History faculty advisor as a candidate. Normally, Honors work involves participation in one of the Undergraduate Seminars during the junior year and selection for the Senior Honors Seminar in the senior year. Further information is available at the History Department office (236 Allen).

Courses Approved for Related Work in History

Anthropology.

Art. History of Art

Economics. But not the courses listed under business administration and accounting except those in economic geography

Education. 54, 104, 225

English and American Literature.

German, Greek, Latin, Russian, and the Romance Languages. The literature courses that are not primarily conversation or composition courses

Greek, Latin. Except those courses that are primarily grammar or composition

Interdisciplinary. 101, 102, 109

Linguistics. 101

Music. History of Music

Philosophy. Except 48

Political Science.

Psychology. 91, 100, 101. And other courses if specifically approved

Religion. Especially those numbered above 100

Sociology.

Honors-Masters Program

For a brief description of this program see page 56 of this *Bulletin*.

Colloquium 101, 102. *The University and the Scholar.* Selected readings and informal discussion about such topics as the role of universities, the art of teaching, academic freedom, and other related matters. 2 s.h.

Interdisciplinary Courses

The following are cooperative courses offered by the departments concerned. Where a department accepts the course for the major, the same

number is used as a departmental offering. Certain other departments accept these courses as related work.

101, 102. *Introduction to the Civilizations of Southern Asia.* Hindu, Islamic, and Buddhist foundations, impact of the West, and emergence of the modern nation-states of Southern Asia. The first semester will analyze traditional Hindu civilization and the Islamic impact on Southern Asia. The second semester will examine western influences and the development of modern societies and states in Southern Asia. (See Anthropology, History.) 6 s.h. *Apte, Braibanti, Crane, Kearney, McCormack, Redd, Rowe, Spengler, Sullivan.*

199. *The Changing South.* A survey of the geography, demography, economics, politics and culture of the South. (See Anthropology, History, Political Science, Sociology.) 3 s.h. (w)

Italian

For courses offered in Italian, see *Romance Languages*, page 168.

Linguistics

The courses in Linguistics may be taken as electives by advanced students; certain courses serve as related work in several departments (see the entries for related work under the separate departments).

No major is offered in Linguistics. Students interested in the study of language as a part of their undergraduate program or as a preparation for graduate work in linguistics should consult the instructors of the courses listed below.

101. *Introduction to Linguistics.* Origin and nature of language, methods of descriptive linguistics with reference to historical and comparative linguistics. No specific prerequisite except sophomore standing. 3 s.h. *Seymour*

For a description of the following courses consult the listings under the specified department.

Language and Society (Anthropology 238) *Apte and McCormack*

Linguistic Anthropology (Anthropology 260, 261) *Apte*

Development of the English Language (English 161)

Modern English Grammar (English 162) *Clogan*

Old English Grammar and Readings (English 207) *Nygard*

History of the English Language (English 208) *Nygard*

Old French Literature (French 219) *Vincent*

Middle High German (German 205, 206) *Seymour*

History of the German Language (German 216) Seymour
Philosophy of Language (Philosophy 109) Welsh
Romance Linguistics (Romance Languages 224) Hull
Old Spanish Language (Spanish 275) Davis

Mathematics

Professor Gergen, *Chairman*; Professor Dressel, *Director of Undergraduate Studies*; Associate Professor Reynolds, *Supervisor of Freshman Instruction*; Professors Carlitz, Elliott, Murray, Shoenfield, and Warner; Adjunct Professor Sewell; Associate Professors J. Burlak, Gallie, and Williams; Assistant Professors Bryson, Burdick, Ellis, Hinrichs, Hodel, Kitchen, Patrick, Scoville, Smith, and Stackelberg; Visiting Assistant Professor Wonnacott; Instructors Helling, Means, and Schoor

The following program of courses in Mathematics is planned for 1966-67.

Fall. 17, 21, 22, 41, 63, 64, 83, 111, 113, 135, 139, 217, 221, 233, 235, 271, 283, 285, 287, 289, 291.

Spring. 21, 22, 42, 63, 64, 84, 112, 114, 131, 136, 140, 204, 218, 221, 222, 234, 236, 244, 262, 272, 286, 288, 290, 292.

11. *Algebra and Trigonometry.* Factoring, fractions, linear equations in one or several unknowns, introduction to coordinates and graphing, exponents and radicals, numerical trigonometry. Prerequisite: two units of college preparatory mathematics. 3 s.h. (E & W) *Staff*

17. *Introduction to Finite Mathematics.* A course designed to introduce students to some of the concepts in modern mathematics. Elementary logic, sets and subsets, vectors and matrices, and probability theory are studied. Some applications of these topics to the biological, social, and physical sciences are considered. Prerequisite: three units of college preparatory mathematics. 3 s.h. (W) *Staff*

18. *Elementary Statistics.* An introduction to statistics with emphasis on fundamental concepts. Topics studied include summarization of data, mean and standard deviation, normal, binomial and other distributions, sampling, statistical estimation, and testing hypotheses. Prerequisites: Mathematics 17. 3 s.h. (W) *Staff*

21, 22. *Introductory Calculus.* Real and complex numbers, rectangular and polar coordinates, graphs, trigonometric and inverse trigonometric functions, logarithmic and exponential functions, conic sections, limits, derivatives, maxima and minima, methods of integration, areas, volumes. Prerequisite: three units of college preparatory mathematics. Mathematics 21 is prerequisite for Mathematics 22. 6 s.h. (E & W) *Staff*

41, 42. *Introductory Calculus.* A special course covering the topics of Mathematics 21, 22 in a more extensive and rigorous fashion, designed

for students who have demonstrated marked proficiency in mathematics. Credit for this course and Mathematics 21, 22 is not allowed. Prerequisite: four units of college preparatory mathematics. 6 s.h. (w) *Staff*

51. *Introduction to Digital Computation.* Flow charts; binary arithmetic; an assembly language; program structures, subroutines, linkages, recursion; data structures, arrays, polynomials; an algorithmic language; numerical linear algebra, matrix inversion, linear programming, estimation of parameters by criteria of Gauss and Chebyshev. A fee of \$8.00 is charged for this course. The fee is payable to the Treasurer's Office of Duke University at the beginning of the semester. Prerequisite: three units of college preparatory mathematics. 3 s.h. (w) *Gallie*

63, 64. *Intermediate Calculus.* Moments, centroids, indeterminate forms, Taylor's formula, approximation of integrals, improper integrals, infinite series, vectors and solid analytic geometry, partial derivatives, multiple integrals, introduction to ordinary differential equations. Prerequisite: Mathematics 22 for 63; and 63 for 64. 6 s.h. (w) *Staff*

83, 84. *Intermediate Calculus.* A continuation of Mathematics 41, 42, with coverage including the topics of Mathematics 63, 64 and related basic topics in mathematics. Credit for this course and Mathematics 63, 64 is not allowed. Prerequisite: Mathematics 42 for 83; and 83 for 84; or permission of the Director of Undergraduate Studies in Mathematics. 6 s.h. (w) *Staff*

111. *Applied Mathematical Analysis I.* Ordinary and partial linear differential equations with constant coefficients, Fourier series and their applications, vectors. Not open to students who have had Mathematics 131. Prerequisite: Mathematics 64. 3 s.h. (w) *Staff*

112. *Applied Mathematical Analysis II.* Complex variables, residues, conformal mapping, matrices, Laplace and Fourier Transforms and their applications. Prerequisite: Mathematics 64. 3 s.h. (w) *Staff*

113, 114. *Modern Algebra.* Vector spaces, linear transformations, matrices, elementary theory of groups, rings, and fields. Prerequisite: Mathematics 63 for 113; and 113 for 114. 6 s.h. (w) *Warner*

131. *Elementary Differential Equations.* Solution of differential equations of elementary types; formation and integration of equations arising in applications. Not open to students who have had Mathematics 111. Prerequisite: Mathematics 63. 3 s.h. (w) *Staff*

135, 136. *Probability and Statistics.* Permutations and combinations, total and compound probability, Bayes' formula, Bernoulli's theorem, discrete distributions, central values, moments and mathematical expectation, law of large numbers, probabilities in continuum, continuous distributions, sampling distributions, confidence limits, tests of hypotheses, and analysis of variance. Prerequisite: Mathematics 63 for 135; and 135 for 136. 6 s.h. (w) *Burdick*

139, 140. *Advanced Calculus.* Multiple integrals and Jacobians, infinite

series, power series, differential equations, vector analysis, line and surface integrals, Green's theorem, Stoke's theorem, improper integrals. Prerequisite: Mathematics 64 for 139; and 139 for 140. 6 s.h. (w) *Elliott*

141, 142. Junior Mathematics Seminar. An honors course designed to coordinate and advance the mathematical knowledge of students who have demonstrated marked proficiency in mathematics and who desire intensive and rigorous work in this subject. Student reports will be required. Prerequisite: Mathematics 84 for 141; and 141 for 142; or permission of the Director of Undergraduate Studies in Mathematics. 6 s.h. (w) *Staff*

183, 184. Senior Mathematics Seminar. An honors course continuing the work in Mathematics 141, 142, designed primarily for seniors. Prerequisites: Mathematics 141 and 142 for 183; and 183 for 184. Mathematics 183 and 184 must be preceded or accompanied respectively by Mathematics 217 and 218. 6 s.h. (w) *Staff*

For Seniors and Graduates

204. Geometry for Teachers. Metric and synthetic approaches to plane and solid geometry; affine geometry; an algebraic model of Euclidean geometry. 3 s.h. *Reynolds*

217, 218. Analysis. Introduction to set theory, construction of real and complex numbers beginning with the Peano postulates, elementary topology of real and complex numbers, properties of continuous functions, derivatives, mean value theorem, Riemann integral, fundamental theorem of integral calculus. Prerequisite: Mathematics 64 for 217; and 217 for 218. 6 s.h. (w) *Scoville*

221. Digital Computer. History of computers; number representation, information storage, logical arithmetic; components and organization of computing systems; coding and programming; programmed arithmetics, function and functional subroutines, interpretive routines, compilers; error analysis. A fee of \$8.00 to provide for materials and clerical services of the Computing Laboratory is charged for this course. The fee is payable to the Treasurer's Office of Duke University at the beginning of the semester. Prerequisite: Mathematics 22. 3 s.h. (w) *Patrick*

222. Introduction to Numerical Analysis. Introduction to numerical analysis, error analysis, real and complex roots of equations, finite difference methods and theory of interpolation, numerical differentiation and integration, numerical integration of ordinary and partial differential equations, simultaneous equations and matrix inversion. Prerequisite: Mathematics 64 and 221. 3 s.h. (w) *Gallie*

227, 228. Theory of Numbers. Congruences, arithmetic functions, compound moduli, quadratic reciprocity, Gauss sums, quadratic forms, sums

of squares. Prerequisite: Mathematics 64 for 227; and 227 for 228. 6 s.h. (w) *Carlitz*

229, 230. Algebraic Numbers. Ideals, unique factorization, divisors of the discriminant, determination of the class number. Prerequisite: Mathematics 113 for 229; and 229 for 230. 6 s.h. (w) *Carlitz*

233. Statistical Methods. Parameter estimation and hypothesis testing from samples, linear regression, correlation, analysis of variance and covariance, components of variance, multiple regression. 3 s.h. (w) *Bryson*

234. Sample Designs. Methods of constructing and analyzing survey designs; elements of simple random sampling, stratified sampling, multi-stage sampling; methods of estimation; questionnaire construction; refusals and not-at-homes. Prerequisite: Mathematics 233. 3 s.h. (w) *Bryson*

235, 236. Abstract Algebra. Groups, fields, rings, matrices, quadratic and bilinear forms, general Galois theory, hypercomplex systems. Prerequisite: Mathematics 64 for 235; and 235 for 236. 6 s.h. (w) *Smith*

244. Design of Experiments. Methods of constructing and analyzing designs for experimental investigation, Latin square, split-plot, simple and partially confounded factorial designs, incomplete block designs, treatment of missing data, techniques of experimentation. Prerequisite: Mathematics 233. 3 s.h. (w) *Burdick*

247, 248. Arithmetic of Polynomials. Field theory, detailed study of finite fields, special polynomials and functions, valuation theory, the zeta function. Prerequisite: Mathematics 235 or consent of the instructor for 247; and 247 for 248. 6 s.h. (w) *Carlitz*

262. Non-Parametric Statistics. A study of statistical tests in which no assumption about the underlying distribution is made; single and multiple sample tests for nominal and ordinal scales; non-parametric measures of correlation, efficiency of tests. Prerequisite: Mathematics 244, or consent of the instructor. 3 s.h. (w) *Bryson*

271, 272. Introductory Topology. Basic set theory; topological spaces; separation axioms, metric spaces, continuity; connectedness; paracompactness. Prerequisite: Calculus. 6 s.h. (w) *Hodel*

283. Probability for Engineers. Basic probability concepts, the sample space, discrete and continuous events, permutations and combinations, conditional and marginal probability, discrete and continuous distributions, estimation, hypothesis testing, confidence intervals, multiple regression, one-way analysis of variance. Prerequisite: Mathematics 64. 3 s.h. (w) *Burdick*

285. Applied Mathematical Methods I. Vectors, line and surface integrals, tensors, complex variables, differential and integral equations. Prerequisite: Mathematics 64. 3 s.h. (w) *Dressel*

286. *Applied Mathematical Methods II.* Wave equation, Fourier series, heat equation, telegraphic equations, Legendre polynomials, Bessel functions, Schrödinger's equation. Prerequisite: Mathematics 64. 3 s.h. (w) *Dressel*

287, 288. *Foundations of Mathematics.* Propositional calculus, predicate calculus, axiomatized number theory. Gödel completeness and incompleteness theorems. Recursive functions; hierarchies; constructive ordinals. Set theory; consistency of the axiom of choice. Prerequisite: Mathematics 64, or consent of instructor for 287; and 287 for 288. 6 s.h. (w) *Shoenfeld*

289. *Applications of Stochastic Processes I.* Recurrent events, random walk, Markov chains and processes, queueing theory, branching and diffusion processes. Prerequisite: Mathematics 135 and 140, or consent of the instructor. 3 s.h. (w) *Williams*

290. *Applications of Stochastic Processes II.* Linear operators, spectral representations, time series, multivariate analysis, auto-regressive schemes, Gaussian processes, cross-correlation functions, smoothing, filtering, prediction, Wiener-Hopf Equation, diffusion processes, Fokker-Planck equation, first-passage times. Prerequisite: Mathematics 289 or consent of the instructor. 3 s.h. (w) *Williams*

291, 292. *Theory of Functions.* Limits, implicit functions, power series, double series, Cauchy's theorem and its applications, residues, Riemann surfaces, conformal mapping. Prerequisite: Mathematics 64 for 291; and 291 for 292. 6 s.h. (w) *Stackelberg*

Departmental Major

For the A.B. degree:

Prerequisite. Mathematics 21, 22.

Major and Related Work. 42 semester hours.

Major Requirements. Mathematics 63, 64 and 18 semester hours in courses in mathematics numbered above 100.

Related Work. 18-24 semester hours of course work from the following departments: chemistry, economics and business administration, philosophy, physics. Two courses above the introductory level must be taken in at least one of these departments.

For the B.S. degree:

Prerequisite. Mathematics 21, 22.

Major and Related Work. 48 semester hours.

Major Requirements. Mathematics 63, 64 and 18 semester hours in courses in mathematics numbered above 100.

Related Work. 14-24 semester hours of course work in the natural

sciences. Two courses above the introductory level must be taken in at least one of these departments.

The Department offers work leading to graduation with distinction. See the section on Honors in this *Bulletin*.

Medical Science

This course in medical science has been approved by the Faculty Council as appropriate for the Bachelor's degree.

M201. *Anatomy as Related to Locomotion.* (Not being offered 1966-67.) The part of the body concerned with locomotion and posture will be dissected completely, whereas the thoracic, abdominal and pelvic organs, and the deeper structures of the head will be taught by means of audio-visual aids and prosections. September to January. Prerequisites: One year each of biology, chemistry, and physics. 6 s.h. *Markee and Everett; Becker and Duke*

Music

Professor Bone, *Chairman*; Professor Mueller, *Director of Undergraduate Studies*; Professor Hamilton; Associate Professors Bryan, Hanks, Klenz, Saville and Withers; Visiting Artist Ciompi; Assistant Professor Hendrix, Visiting Assistant Professor Earls; Instructors Fishbaugh, Friedberg and Henry; Mmes. Cushman, McCall and Phelps

Courses in music are offered both for the general student who wishes to acquire knowledge of music as literature and, on a more technical level, for those prepared to major in the field. The courses marked * are open to general students without prerequisite.

Theory and Composition

65-66. *Music Theory I. Harmony and Theory of Music.* Manipulation and analysis of melodic, harmonic, rhythmic, contrapuntal and formal principles of tonal organization through written exercises, ear training, sightsinging and keyboard harmony. Three lectures, two laboratory hours throughout the year. 8 s.h. (E) *Earls and Fishbaugh*

115-116. *Music Theory II. Advanced Harmony and Counterpoint.* First semester, exercises in advanced harmonic techniques and studies in formal analysis; second semester, emphasis on contrapuntal techniques and writing in the smaller forms. Prerequisite: Music 65-66. Two lectures; two laboratory hours throughout the year. 6 s.h. (E) *Klenz and Fishbaugh*

117, 118. Music Theory III. Composition and Analysis. The development of technical and expressive means in various media and styles through practical exercises in composition and analysis of larger forms. The completion of an original work in an instrumental or choral medium. Prerequisite: Music 115-116 or consent of the instructor. 4 s.h. (E) *Hamilton*

121. Conducting. The conducting of orchestral and vocal scores. Score-reading and analysis, principles of interpretation, establishment of vocal and instrumental conductoral techniques leading to practical experience in conducting the department musical organizations in rehearsal. Prerequisites: Music 65-66, 115-116 or consent of the instructor. 3 s.h. (E) *Bone*

122. Orchestration. A study of the technical characteristics and transpositions of the instruments of the modern symphony orchestra and concert band. Instrumentation of piano scores of original compositions for string, woodwind, brass ensembles, and for full symphony orchestra or concert band. Prerequisites: Music 65-66, 115-116 or consent of the instructor. 3 s.h. (E) *Bone*

History and Literature

1-2. *Introduction to Music Literature. Rhythm, melody, harmony, form, instruments of the orchestra as principal elements of an effective listening technique. Selected works representing major composers of the Baroque, Classic, Romantic, and Contemporary periods are approached through the several performance media of song, orchestra, piano, chamber music, opera. Open only to freshmen; others, see Music 51-52 and 51X-52X. 6 s.h. (E) *Henry*

51-52. *Introduction to Music Literature. The aims of this course are identical with those of Music 1-2; the content and method are adapted to the capacities of upperclassmen. Open only to upperclassmen who have not completed Music 1-2. 6 s.h. (E) *Staff*

51X-52X. *Introduction to Music Literature. A special section for music majors and advanced general students. A historical, stylistic survey of music literature from 1600 to the present. 6 s.h. (E) *Earls*

125. *Masterworks of Music Literature. An intensive study of selected masterworks which represent the principal currents in modern music history. Compositions by Bach, Mozart, Beethoven, Brahms, Debussy and Bartok will constitute a frame of reference for historical, biographical and stylistic analysis. 3 s.h. (E) *Hamilton and Mueller*

134. *Choral Literature. A study of great choral works from the Renaissance to the present. The development of the mass, motet, cantata, oratorio, and passion, with attention to changing aesthetic and religious concepts as well as to formal and stylistic means. Intensive study of

complete scores of composers selected from palestrina to Stravinsky; individual projects. 3 s.h. (E) *Saville*

135. *Piano Literature*. A survey of the great works for keyboard instruments, from the time of the English virginal composers to the present. Prerequisites: Music 47A, 48A, 97A, and 98A, or consent of the instructor. 3 s.h. (E) *Withers*

136. *Solo Song Literature*. A study of selected standard repertoire: early Italian and English songs, German lieder; the French, English and American art song and the standard operatic aria. Open to voice students and others by consent of the instructor. 3 s.h. (E) *Hanks*

139. *Twentieth Century Music*. The course will trace the most influential creative stylistic developments in music of the present century. A critical survey will emphasize works by key figures Bartok, Berg, Schonberg, and Stravinsky as a means of establishing a relative standard of values for subsequent independent exploration. Prerequisite: A one-year course in Music Theory or Literature, or consent of the instructor. 3 s.h. (E) *Hamilton*

147-148. *History of Music*. The history of the development of music as a manifestation of Western culture from mediaeval to modern times. The rise of Christianity through the Renaissance, first semester; the Baroque to the present, second semester. Prerequisite: A one-year course in Music Theory or Literature, or consent of the instructor. 6 s.h. (E) *Earls and Klenz*

149. *Organ Literature*. A survey of the great works for organ from Bach to the present day. Interpretive analysis illustrated through performance whenever practicable. Attention will be given to problems of registration and style relating to the technical capacities of organ construction in each period studied. Emphasis on J. S. Bach, 19th century French and contemporary organ works. Open to organ students and others by consent of the instructor. 3 s.h. (w) *Hendrix*

163. **Music in the Eighteenth Century*. The development of important instrumental and vocal media and formal concepts through study of the music, the musicians and their environment. 3 s.h. (E) *Bryan*

164. **Music in the Nineteenth Century*. A study of the music of the nineteenth century, from Beethoven to Debussy, with attention to artistic and literary influences, and the relations among the creative minds of the time. Individual projects. 3 s.h. (E) *Mueller*

165. **Opera Literature*. A study of opera from the Florentine Camerata to the present. The development of the operatic idea, with attention to changing relationships of music and text, to opera as social commentary, as well as to formal and stylistic means. Intensive study of complete scores of composers selected from Monteverde to Bartok; individual projects. 3 s.h. (E) *Saville*

Independent Study and Senior Seminar

Admission to these courses will be subject to approval of the Director of Undergraduate Studies of the Department of Music and the individual instructor. The instructor as well as the course content will be established in accordance with the individual student's interests and capacities.

The Department offers work leading to graduation with distinction. See the section on Academic Honors on page 55.

191, 192. *Independent Study.* Directed reading and research and musical analysis within a prescribed area of musical literature. Open only to highly qualified students in the junior year, by permission of the department. See page 56. 6 s.h. (E) *Staff*

193, 194. *Independent Study.* Same as 191, 192 but for seniors. See page 56. 6-12 s.h. (E) *Staff*

195. *Correlating Independent Study.* Correlated study in the humanities, cultural epochs in European civilization or church history and liturgy is suggested. An extended paper is required. Intended primarily for senior music majors, but other qualified students may be admitted. 3 s.h. (E) *Klenz*

197, 198. *Senior Seminar in Music.* Offers guidance in the sources and materials of musical literature, and in the methods of stylistic analysis and criticism. A background of historical, stylistic, and theoretical knowledge is essential. Formal papers will be required. Open only to seniors, but not restricted to candidates for degree with distinction. 6 s.h. (E) *Staff*

Music Education

57-58. *Vocal Diction.* Problems of diction as specifically applied to the art of singing. Required of all Applied Voice Majors. 2 s.h. (E) *Hanks*

106. *Piano Methods and Materials.* A study of the materials and methods of piano pedagogy. The appropriate choice of essential and supplementary literature. Development of technique, style, and musicianship. Supervised practice teaching. Prerequisite: Music 47A, 48A, 97A, and 98A, or consent of the instructor. 3 s.h. (E) *Withers*

151. *Public School Music Education.* Development of the child through music. Child voice and song literature; rhythmic activities; learning to listen; use of elementary instruments such as the autoharp, psaltery, bells, rhythm band instruments. Both group and individual help in elementary music theory; music reading exercises; chording and improvising piano accompaniments; conducting; construction of rhythm band scores. Integration of music with other activities, such as planning music for social studies units. 3 s.h. (E) *McCall*

152. *Public School Music Literature.* A study and analysis of key works in the symphonic, pianistic, and vocal repertoire which are particularly

applicable to the teaching of music appreciation as a cultural aspect of social studies in the public school. 3 s.h. (E) *McCall*

153. *Vocal Music in the Public School.* Aims, repertoire, and techniques for teaching vocal music in the junior and senior high schools. Emphasis on organizations, administration, training, and performance of school choirs and ensembles; care of the changing voice. Planning a good music curriculum. 3 s.h. (E) *Saville*

154. *Instrumental Music in the Public School.* Materials and methods of teaching instrumental music in the junior and senior high schools; emphasis on teaching technics, repertoire, organization, and administration of the instrumental curriculum. 3 s.h. (E) *Bone*

Applied Music

The study of Applied Music concerns the understanding of music literature through performance. Instruction is offered in the following media: A. Piano; B. Strings; C. Woodwinds; D. Brass; E. Voice; F. Ensemble—Instrumental, Piano, Vocal coaching and performance; participation through one of the Departmental Ensembles listed at close of the Music section; G. Organ. Instruction in media A through E may be private or in classes limited to a minimum of 4 and a maximum of 7 students. Class instruction is restricted to the first 4 grades of proficiency. Class instruction shall be designated by adding the letter X to the appropriate medium and year-in-school classification. (Example: junior year, Woodwinds, class instruction is recorded 147CX.)

Students must contact the Music Department office so as to arrange an audition with the appropriate instructor *prior to registration in Applied Music courses*. The course numbers listed below refer to the student's class standing and not his musical proficiency.

Piano. 47A, 48A; 97A, 98A; 147A, 148A; 197A, 198A. For freshmen, sophomores, juniors, seniors. 1 or 2 s.h. (E) *Withers, Fishbaugh and Phelps*

Violin, Viola, 'Cello. 47B, 48B; 97B, 98B; 147B, 148B; 197B, 198B. For freshmen, sophomores, juniors, seniors. 1 or 2 s.h. (E) *Ciampi and Klenz*

Woodwinds. 47C, 48C; 97C, 98C; 147C, 148C; 197C, 198C. For freshmen, sophomores, juniors, seniors. 1 or 2 s.h. (E) *Henry*

Brass. 47D, 48D; 97D, 98D; 147D, 148D; 197D, 198D. For freshmen, sophomores, juniors, seniors. 1 or 2 s.h. (E) *Bryan*

Voice. 47E, 48E; 97E, 98E; 147E, 148E; 197E, 198E. For freshmen, sophomores, juniors, seniors. 1 or 2 s.h. (E) *Hanks and Cushman*

Ensemble. 47F, 48F; 97F, 98F; 147F, 148F; 197F, 198F. For freshmen, sophomores, juniors, seniors. 1 s.h. (E) *Staff*

Organ. 47G, 48G; 97G, 98G; 147G, 148G; 197G, 198G. For freshmen, sophomores, juniors, seniors. 1 or 2 s.h. (E) *Hendrix*

Credits. Credit for instruction in media A, B, C, D, E, and G is granted on the basis of 2 s.h. per semester for *one hour* of private instruction per week and a minimum of six hours practice weekly; or 1 s.h. per semester for *one-half hour* of private instruction, or one period of class study, and a minimum of six hours practice per week. An additional weekly class meeting for performance and criticism may be required by the instructor without additional credit.

Credit for instruction in medium F is granted on the basis of 1 s.h. per semester for one rehearsal period of instruction and a minimum of three hours practice per week.

Music majors. Shall plan their Applied Music study so as to meet the following requirements of their chosen areas of concentration:

Majors in Music Theory or Music History and Literature should earn a minimum of 6 s.h. credit in Applied Music.

Majors in Applied Music must register for one hour of private instruction *per semester* and may earn a maximum of 18 s.h. credit in Applied Music.

Majors in Music Education who expect to teach music in the public schools should plan their Applied Music programs in consultation with the Director of Undergraduate Studies in Music. The credit hours in Applied Music required for certification in North Carolina may be earned through a program which includes the study of a major medium, a minor medium and participation in departmental organizations. (See p. 11 of this *Bulletin*).

Nonmajors. Students other than music majors may receive not more than 8 s.h. credit for work in Applied Music. They may elect after consultation with the Department either 1 hour (2 s.h. credit) or ½ hour (1 s.h. credit) of private instruction per semester. *No credit in Applied Music* will be allowed unless the student satisfactorily completes at some time before graduation six semester hours in Music Theory, or Music History and Literature.

Fees. Upper class students who have been accepted as music majors at the time of registration for applied music courses are exempt from paying the applied music fees. Other students are charged for all applied music media except "F" (Ensemble).

Fees are payable to the Treasurer's office of Duke University upon notification from that office at the beginning of each semester as follows:

One ½ hour private lesson per week for one semester.	\$45.00
Two ½ hour private lessons per week or one 1-hour private lesson per week for one semester.	80.00
One 1-hour class lesson per week for one semester.	20.00

All students registered for applied music instruction are charged for practice room facilities—students having practice facilities off campus *must* notify the departmental office of this fact by the end of the third week of *each* semester; otherwise they will be automatically billed as follows:

Medium A. Piano	}	\$15.00 per semester (room with piano or organ)
Medium E. Voice		
Medium G. Organ		
Medium B. Strings	}	\$10.00 per semester (room without piano)
Medium C. Woodwinds		
Medium D. Brass		
Medium F. Ensemble		No practice room fee is charged

Departmental Major

Prerequisites. Music 51-52 and 65-66.

Major Requirements. A minimum of 24 s.h. beyond the prerequisite courses. Initial work in the Department includes the following required courses: freshman year, Music 65-66; sophomore year, Music 51-52, Music 115-116; junior year, Music 147-148.

During Orientation Week all prospective entering Freshman Music Majors are required to take: A. Piano proficiency exam., B. Theory proficiency exam., C. Audition in their major performance medium.

Areas of Upperclass Specialization

Concentration in one of four major areas in Music is possible in the junior and senior years. While the following outlines include more than the number of hours *required* for a major in music, they are strongly recommended by the Department as a basis for effective study.

Theory and Composition

Required: Music 117-118, 122; Applied Music: 6 s.h.

Additional Departmental Recommendations: Music Electives: 6 s.h.

History and Literature

Required: 2 Elective Courses in Music Literature; plus Music 197, 198; Applied Music: 2 s.h.

Additional Departmental Recommendations: Music Electives: 10 s.h., including a minimum of 4 s.h. in Applied Music.

Applied Music. A program of study designed for those students who intend to become performers and teachers of applied music.

Required: Applied Music: 12 s.h.

Additional Departmental Recommendations: Applied Music: 6 s.h.; Piano or Organ: Music 135 or 149; 106 (Piano Majors only); Voice: Music 136; 57-58; Other Media: Study sequence to be worked out in consultation with the Director of Undergraduate Studies.

Music Education. A program of study designed for prospective teachers of High School Instrumental or Vocal Music. Details of this program are shown on page 11 of this *Bulletin*.

The music major must participate in one of the Departmental Ensembles or Organizations during *each* semester of undergraduate study.

Departmental Ensembles

Brass Ensemble

Chamber Orchestra

Madrigal Singers

Piano Ensemble (may be in combination with Instruments or Voice)

String Ensemble (Sonata, Trio or Quartet)

Vocal Ensemble (Opera Workshop)

Woodwind Quintet

Departmental Organizations

Duke University Concert Band

Duke University Symphony Orchestra

Naval Science

Professor Caldwell, Captain, U. S. Navy, *Chairman*; Associate Professor Butner, Lieutenant Colonel, U. S. Marine Corps, *Director of Undergraduate Studies*; Assistant Professors: Grayson, Major, U. S. Marine Corps; Rumelhart, Lieutenant Commander, U. S. Navy; Stutz, Lieutenant Commander, U. S. Navy; Cracknell, Lieutenant Commander, U. S. Navy; Degnon, Lieutenant, U. S. Navy

Standardized titles and numbers for courses are established by the Bureau of Naval Personnel for use at the 52 NROTC institutions. The first digit indicates the year of the course; the second digit (o) indicates that it is given on a semester basis; the third digit indicates the semester of the school year in which offered. Specialized courses for Marine Corps Officer candidates are indicated by the letter "M" after the number, and substitute for the basic course of the same number.

NS 101. *Naval Orientation.* History of navy regulations, naval customs and courtesies which are basic to further study of Naval Science. Introduction to carrier, air, surface, undersea, and amphibious warfare; basic types, characteristics, capabilities, and limitations of naval vessels; deck seamanship; naval formations and maneuvers. 3 s.h. (w) *Cracknell*

NS 102. *Naval History.* Naval history relating the rise and fall of sea

power to other aspects of world history as a basis for understanding the role of navies in the world today. 3 s.h. (w) *Cracknell*

91. *Introductory Psychology.* See page 115 of this *Bulletin* for course description. This is a University course required for all NROTC midshipmen.

NS 201. *Naval Weapons.* A survey of the fundamentals of naval weapons and systems including the gun-weapon delivery problem, anti-submarine warfare, missiles, nuclear weapons, and space technology and their application to the control of the seas. 3 s.h. (w) *Degnon*

NS 301. *Navigation.* Magnetic and gyro compasses; principles of chart construction; dead reckoning; piloting, nautical astronomy including a study of the actual and apparent motion of the earth, celestial coordinates, times systems, the astronomical triangle, identification of stars and planets; solutions of observations for lines of position; and work in practical navigation. 3 s.h. (w) *Stutz*

NS 302. *Naval Operations.* A survey of the components of general naval operations including concepts and application of relative motion, collision prevention, communications, weather, and the command and delegated functions involved in maneuvering single ships and multiship formations. 3 s.h. (w) *Stutz*

NS 401. *Naval Engineering.* Principles of steam engineering as related to naval power plants for main propulsion and auxiliary machinery; principles of the marine nuclear engineering propulsion system; principles of ship stability and damage control; a general understanding of internal combustion engines. 3 s.h. (w) *Rumelhart*

NS 402. *Principles and Problems of Leadership.* A study of the principles and problems of effective leadership with emphasis on the role of the military leader. Leadership precepts of personal example, sound management practice, and moral responsibility; human relations; discipline and administration of military justice are included. 3 s.h. (w) *Rumelhart*

NS 401M. *Amphibious Warfare.* History and development of amphibious operations and organization; analyses of amphibious operations of World War II and of the Korean action. 3 s.h. (w) *Grayson*

For Marine Corps Candidates.

NS 402M. *Amphibious Warfare, Part II.* Further study of selected amphibious operations; Uniform Code of Military Justice; leadership. 3 s.h. (w) *Grayson*

For Marine Corps Candidates.

Nursing

The nursing program is published separately in the *Bulletin of the School of Nursing*. (See inside of front cover.)

Philosophy

Professor Baylis, *Chairman*; Associate Professor Wilson, *Director of Undergraduate Studies*; Assistant Professor Binkley, *Supervisor of Freshman Instruction*; Professors Clarke, Negley, Peach, and Welsh; Assistant Professors Mahoney, Spector

The undergraduate program in the Department of philosophy is designed to acquaint students with the content and the structure of philosophical theory in various areas. Discussion is encouraged so that the student can engage actively in the philosophical examination of problems.

Course offerings fall into two general categories: the systematic and the historical. In a systematic treatment, the organization of a course is primarily in terms of the problems presented by the subject-matter of that course, as in logic, ethics, metaphysics, etc. In historical courses, attention is directed more to the order of development in the thought of a particular philosopher (Plato, Aristotle, Kant, etc.), or in a historical period. In all courses, reading of the works of philosophers will acquaint the students with the important and influential contributions to the definition and solution of philosophical issues.

The problems raised in philosophy in respect to the various field of the arts and sciences involve questions which are not normally given attention in those particular disciplines. In the consideration of such problems, therefore, it is expected that the student will acquire some understanding and perspective of the major areas of man's intellectual endeavor. In this sense, philosophical comprehension is an essential part of a student's learning and education.

41, 42. *Knowledge, Fact, and Value.* An introduction to philosophy through the study of some of its main problems. These include, in Philosophy 41, the nature of truth and fact, of evidence, faith and knowledge, and of the fundamental categories descriptive of the universe. In Philosophy 42 these include the nature and ground of values, ultimate goals, and moral obligation. (Philosophy 42 may be taken before, or with, Philosophy 41.) Not open to juniors and seniors who have not already had one of the sequence. 6 s.h. *Staff*

43, 44. *Freshman Tutorials.* Open only to students concurrently enrolled in Philosophy 41 or 42. 1 s.h. (r) *Binkley and Peach*

48. *Logic.* A study of the conditions of effective thinking and clear communication. Examination of the basic principles of deductive reasoning. 3 s.h. *Binkley, Clark, and Welsh*

93, 94. *History of Philosophy: Ancient and Modern.* An introduction to philosophy through the study of some of the major writings of the ancient Greek philosophers (93) and modern philosophers through Kant (94). 6

s.h. (E) (Open to freshmen with a B average.) *Mahoney, Spector, Peach and Wilson*

101. *Philosophy of Religion.* A philosophical examination of selected concepts and doctrines of religion. 3 s.h. (E) *Binkley*

103. *Symbolic Logic.* Detailed analysis of deduction and of deductive systems. Open to sophomores only by permission of instructor. 3 s.h. (E) *Clark and Wilson*

104. *Philosophy of Science.* The principal philosophical and methodological problems in contemporary science. 3 s.h. (E) *Spector*

107. *Political and Social Philosophy.* Discussion of the fundamental principles of political and social organizations, with particular attention to democratic philosophy, corporate theory, and Marxist-Soviet philosophy. 3 s.h. (W) *Negley*

108. *Social Ideals and Utopias.* Reading of selected Utopias; analysis of the value-structures and political principles of these ideal societies. 3 s.h. (W) *Negley*

109. *Philosophy of Language.* A philosophical analysis of problems arising in the study of language and symbolism. Topics include: Theories of language, the nature of signs and symbols, theories of meaning, types of discourse (scientific, mathematical, poetic), definition, ambiguity, metaphor. 3 s.h. (E) *Welsh*

110. *Epistemology.* A treatment of the problems of truth and knowledge; of *a priori* and empirical statements; and of theories of perception and probability. 3 s.h. (E) *Baylis, Binkley*

111. *Metaphysics.* A consideration of a selection from the following: Hegelian essentialism and existentialist reaction; traditional treatments of the mind-body problem: dualism, phenomenism and materialism; rival theories of causation, space and time. 3 s.h. (E) *Baylis, Binkley, and Wilson*

117. *Ancient and Modern Ethical Theories.* The development of ethical thought in the West; the interaction between culture and ethical theory, with special reference to the Greek city-state, Roman law, the Renaissance, the Reformation, and the rise of modern science. Readings in the great ethical philosophers. 3 s.h. (E) *Welsh*

119. *Mediaeval Philosophy.* An introduction to the development of philosophy from late antiquity to the sixteenth century. Topics will include Augustine, Avicenna, Averroes, Albert and Great, Aquinas, Scotus, Occam and Latin Averroism. 3 s.h. (E) *Mahoney*

For Seniors and Graduates

202. *Aesthetics: The Philosophy of Criticism.* A study of some fundamental issues in aesthetics with particular reference to the fields of literature, music and painting. Problems discussed include the role of standards

in criticism, aesthetic judgment, interpretation and evaluation in the arts, meaning in the arts, art and truth, the arts and morality. Open to juniors with the approval of the instructor. 3 s.h. *Welsh*

203. *Contemporary Ethical Theories.* Study of the nature and justification of basic ethical concepts in the light of the chief ethical theories of twentieth century British and American philosophers. 3 s.h. *Baylis and Binkley*

205. *The Philosophy of History.* Discussion of the method, metaphysical implications, and influence of interpretations of history; Hegel, Marx, Spengler, Toynbee. 3 s.h. (w) *Negley*

208. *Political Values.* Analysis of the systematic justification of political principles and the political values in the administration of law. 3 s.h. (w) *Negley*

211. *Plato.* A critical study of the dialogues with special emphasis on problems in ethics, epistemology, and metaphysics. 3 s.h. (E) *Mahoney*

217. *Aristotle.* A study of parts of the *Organon*, *Physics*, *De Anima*, and *Metaphysics*. 3 s.h. (E) *Mahoney*

219. *Kant.* Reading and discussion of his philosophy, with some attention to historical continuity. 3 s.h. (w) *Negley*

225. *British Empiricism.* A critical study of the writings of Locke, Berkeley, or Hume, with special emphasis on problems in the theory of knowledge. 3 s.h. (E) *Peach*

227. *Continental Rationalism.* A critical study of the writings of Descartes, Spinoza, or Leibniz with special emphasis on problems in the theory of knowledge and metaphysics. 3 s.h. (E) *Peach*

228. *Recent and Contemporary Philosophy.* A critical study of some contemporary movements in philosophy with special emphasis on the work of Moore, Russell, Wittgenstein, Wisdom, and Ryle. 3 s.h. (E) *Welsh*

229. *American Pragmatism.* Studies in the philosophy of Pierce, James, Dewey, and Mead. 3 s.h. (E) *Welsh*

233. *Introduction to the Philosophy of Science.* A systematic study of some central problems in the methodology of the sciences, e.g., the concept of a scientific explanation, theory and observation, and other topics. To be given in the fall of 1966. *Spector*

234. *Philosophy of Science.* Selected problems in the physical and non-physical sciences. Topics such as space, time, measurement, probability and induction, and problems in the philosophy of the behavioral and social sciences. Prerequisite: Philosophy 233. *Spector*

235. *Philosophy and the Sciences.* An introduction to the philosophy of science with emphasis on the writings of philosophers and scientists in the history of science, such as Galileo, Newton, Mach, Poincaré, and Einstein. (1964-65) *Spector*

236. *Special Problems in the Philosophy of Science.* Selected topics concerning the methods of the sciences and the philosophy of science. To be given in the spring of 1967. Prerequisite: Previous work in the philosophy of science, or consent of the instructor. *Spector*

The four courses above are given normally in a two year cycle.

241. *Logic.* Fundamental problems of logic. 3 s.h. (E) *Clark and Wilson*

246. *General Semantics and Theory of Language.* An examination of semantical theory through Frege, Russell, Church, Tarski, Carnap, and Quine, together with a consideration of the implications of meaning theory for general philosophy. Prerequisite: Philosophy 103 or the equivalent. 3 s.h. (E) *Wilson*

250. *Philosophical Analysis.* A critical study of recent and contemporary essays in philosophical analysis, and an evaluation of the nature, methods, and results on this movement. 3 s.h. (E) *Baylis, Clark, and Wilson*

252. *Metaphysics.* A critical and evaluative study of rival metaphysical theories and their bases. Analysis of the fundamental metaphysical categories and of metaphysical methods. 3 s.h. (E) *Baylis, Clark, and Wilson*

291, 292. *Critical Philosophy.* The analysis of basic philosophical concepts and beliefs with a view to critical evaluation and constructive emendation of them. Emphasis on the practice as well as the principles of philosophical criticism and problem solving. 3 s.h. each. Enrollment only by permission of the department. 291 is ordinarily prerequisite for 292. (E) *The Graduate Staff*

Departmental Major

Philosophy 48 (Logic) is recommended for all those intending to major in philosophy. Philosophy 41, 42 is ordinarily a prerequisite to major work.

Major requirements. 24 semester hours in philosophy of which at least eighteen must be in courses numbered above 48. The following must be included: Philosophy 93, and 94; Philosophy 117, or 203, or 208; and 6 semester hours in Philosophy senior-graduate courses.

Related Work. Six hours minimum in each of two departments approved by the philosophy adviser. Courses may not be those primarily open to freshmen. There is no restriction in principle as to departments in which related work may be taken, and the approval of the Philosophy adviser is required only to insure some coherence in the program of major and related work as a whole.

The Department offers work leading to graduation with distinction. See the section on Honors.

Physics

Professor Fairbank, *Chairman*; Professor Meyer, *Director of Undergraduate Studies*; Professor Carpenter, *Supervisor of Freshman Instruction*; Professors Biedenharn, Fowler, Gordy, Greuling, Lewis, Newson and Nielsen; Associate Professor Robinson; Assistant Professors Bilpuch, Evans, Fortney, Hunt, Roberson, Tilley and Walter; Lecturer Barton; Instructors Cook, Guyer, and Richardson

1-2. Introductory Physics. This course traces historically and experimentally the development of the important principles of physics. This course is open to freshmen, sophomores and juniors and meets the general science requirement. Three lectures and one two-hour laboratory each week. 8 s.h. (w) *Carpenter, Nielsen, Barton, and Assistants*

41-42. General Physics. This course treats the basic principles of general physics in a more quantitative manner than Physics 1-2. It meets in a thorough way the physics requirement for entrance into the study of either medicine or engineering, and is well suited for the general science student. This course is not open for credit for students who have completed Physics 1-2. Three lecture-recitations and one three-hour laboratory period each week. Prerequisites: Mathematics 21, 22 or equivalent (Mathematics 21, 22 may be taken concurrently). 8 s.h. *Evans, Fairbank, Greuling, Lewis, Robinson, Walter and Assistants.*

125. Intermediate Physics—Mechanics. The course covers in a thorough manner the elements of mechanics. Three recitations per week. Prerequisites: Physics 1-2 or 41-42 or equivalent, and a course in differential and integral calculus. Mathematics 22 may be taken concurrently. 3 s.h. (w) *Fortney*

126. Intermediate Physics—Electricity. The elements of electricity and magnetism. Three lectures and one three-hour laboratory per week. Prerequisites: Physics 125 or equivalent work approved by the instructor and differential and integral calculus. 4 s.h. (w) *Fowler*

161, 162. Modern Physics. Review of electromagnetic fields, relativity, quantum phenomena, atomic and molecular spectra, solids, and nuclear physics. Three lectures each week. Prerequisites: Physics 41-42, Mathematics 22. 161 is prerequisite for 162. 6 s.h. (w) *Roberson*

171. Electronics. A.C. circuits, transients, fundamentals of vacuum tubes and electron physics, basic electronic circuits. Three lectures and one three-hour laboratory each week. Prerequisite: Physics 126 or equivalent work approved by the instructor. 4 s.h. (w) *Hunt*

176. Intermediate Physics—Thermodynamics and Kinetic Theory. The elements of thermodynamics, kinetic theory and elementary statistical mechanics. Three lectures per week. Prerequisites: Physics 125 or equiv-

alent work approved by the instructor, and differential and integral calculus. 3 s.h. (w) *Meyer*

A course in general college physics, Physics 125 and 126 or equivalent validated by examination, and a course in differential and integral calculus are prerequisites to all courses numbered 200 and above.

201, 202. *Mechanics.* The fundamental principles of Newtonian mechanics; general dynamics of systems of particles and rigid bodies; the methods of LaGrange and Hamilton; generalized mechanics. 6 s.h. *Greuling, Fortney*

213, 214. *Contemporary Physics.* A course which covers the fundamental concepts and the experimental basis of modern physics. Three lectures each week. 6 s.h. (w) *Walter*

217, 218. *Advanced Physics Laboratory.* Measurements involving the fields of mechanics, electricity magnetism, heat, optics and modern physics. 6 s.h. (w) *Meyer*

220. *Advanced Electronics.* Vacuum tubes and solid state devices, advanced circuit analysis. Three lectures and one three-hour laboratory each week. 4 s.h. (w) *Hunt*

221, 222. *Theoretical Physics.* Mechanics of particles and of rigid bodies, elasticity, fluids dynamics, electrodynamics; optic, relativity thermodynamics, statistical mechanics, wave mechanics. Prerequisite: Mathematics 285-286 or equivalent to be taken at least concurrently. 6 s.h. (w) *Cook*

223. *Electricity and Magnetism.* Electrostatics, magnetostatics and potential theory; dielectric and magnetic media; magnetic field of currents and law of induction. 3 s.h. (w) *Robinson*

224. *Electricity and Magnetism.* Maxwell's electrodynamics, theory of wave optics, refraction, interference and diffraction. Prerequisite: Physics 223. 3 s.h. (w) *Robinson*

225, 226. *Elementary Investigations.* The aim of this course is to provide training in the laboratory and library methods of physical research. Properly qualified students may conduct elementary investigations under the supervision of a member of the staff. 3-6 s.h. (w) *The Staff*

Departmental Major

A student wishing to major in physics should arrange to complete the necessary mathematics as soon as possible.

For the A.B. degree:

Prerequisites. Physics 1-2 or 41-42 or equivalent, and Mathematics 21, 22.

Major Requirements. At least 18 semester hours in physics including Physics 125, 126, 171 and 176 or equivalent 217 or 218.

Related Work. Eighteen to 24 semester hours from the following courses: Mathematics 21, 22, 41, 42, 63, 64, 83, 84, and 131 and Chemistry 1-2.

For the B.S. degree:

Prerequisites. Physics 1-2 or 41-42 or equivalent, and Mathematics 21, 22 or equivalent.

Major Requirements. Physics 125, 126, 171, and 176 or equivalent, 213, 214, 217, 218 and either 201 or 223.

Related Work. Fourteen to 24 semester hours from the following courses: Mathematics 21, 22, 41, 42, 63, 64, 83, 84 and 131 and Chemistry 1, 2 or 1 and 42.

The Department offers work leading to graduation with distinction. See the section on Honors.

Political Science

Professor Hallowell, *Chairman*; Associate Professor Hall, *Director of Undergraduate Studies*; Professors Ball, Braibanti, Cole, Connery, Leach, Kulski, Rankin, and Wilson; Visiting Professor Dawson, Associate Professors Proctor and Simpson; Assistant Professors Cheek, Howard, Kearney and Kornberg; Visiting Assistant Professor Meekison; Instructors Lewis and Wagner

The objective of the Department of Political Science is to acquaint students with the theory and practice of government and politics at the local, state, national and international levels. While primary attention is focused upon the American political and administrative system, emphasis is also placed upon a comparative study of the political institutions and movements of thought peculiar to the nations of Europe, Latin America, Africa and Southern Asia. The student's attention is also directed to the problems encountered in international organization, politics and law. The development of political philosophy from Plato to the present day is an essential part of the department's course offerings. Methods of study include the descriptive, the historical, the legal, the comparative and the philosophical.

Directing its effort to an intelligent understanding of the contemporary world and of the responsibilities which are laid upon citizens of a democracy, the Department of Political Science shares the objectives of a liberal arts education. While the department does not aim at vocational education, the knowledge it seeks to impart should be useful to anyone contemplating a career in the government service or politics.

Students intending to major in the department should take Political Science 11-12 or 61-62. Ordinarily one of them must be taken before proceeding to more advanced work in the department. This rule may be waived with the consent of the Director of Undergraduate Studies.

The advanced courses are divided into three major groups but no sequence of courses beyond the introductory course is prescribed. The student would be well advised, however, to select some courses from each group.

The Senior Seminar is designed to provide an opportunity for majors in the department to pursue independent study and research, and to qualify for graduation with distinction.

Introductory Courses

11-12. *American and European Political Systems.* An introduction to the theory and practice of modern government. An introductory course for freshmen dealing with the topics indicated in the description of Political Science 61-62. (Open only to freshmen) 6 s.h. (E & W) *Hall; Cheek, Kearney, Kornberg and Meekison; Lewis and Rooks*

61-62. *American and European Political Systems.* An introduction to the theory and practice of modern government. The first semester is devoted to the study of American constitutional democracy. Topics examined include federal-state relations, the separation and interrelationships of the executive, legislative and judicial branches of government, judicial review, the role of political parties and public opinion, the formulation and execution of domestic and foreign policy, civil liberties. The second semester is devoted to a study of constitutional democracy in Great Britain and France with emphasis upon the similarities and differences between those systems and our own. Detailed attention is also given to an examination of the theory and practice of totalitarian dictatorship as exemplified in the U.S.S.R. (Not open to Freshmen.) 6 s.h. (E & W) *Leach; Simpson; Cheek, Howard, Kornberg and Meekison; Lewis and Wagner; Breckenridge and Rooks*

Political Theory and Comparative Government

123. *Introduction to Political Philosophy.* A course devoted to the reading and discussion of selected political classics including Plato's *Republic*, Aristotle's *Ethics* and *Politics* and other works as time permits. 3 s.h. (W) *Hallowell*

127. *Introduction to Law.* An introduction to the nature and functions of law, with emphasis on the varied uses of law in ordering society, the process of legal growth and the nature of legal reasoning. Some attention will be given to basic issues of jurisprudence. 3 s.h. (W) Open only to Juniors and Seniors. *Howard*

131. *Introduction to American Political Thought.* Basic elements in the American political tradition as developed from its English roots to the present. 3 s.h. (W) *Leach*

136. *Major European Governments.* A general introductory survey of the governments of Great Britain, France, Germany, Italy, and the Soviet Union. Special attention is given to constitutional developments, the organization and ideologies of political parties, and current political problems. 3 s.h. (w) [Not open to students who have taken Political Science 12 or 62 but open to all others without prerequisite.] *Cole*

151. *Comparative Government and Politics: Latin America.* A study of politics and government in selected Latin American states, including Argentina, Brazil, Chile and Mexico. Political forces and their impact upon governmental institutions. 3 s.h. *Ball and Lewis*

155. *Problems of Political Development in the New States.* Survey of change and modernization in Africa and Asia; nationalism and neutralism, role of political parties, the military, and the bureaucracy in nation building; economic growth and foreign aid. 3 s.h. (w) *Kearney*

165. *The Government and Politics of the U.S.S.R.* An analysis of the governmental institutions, party structure and policies of the Soviet Union. Attention will be given to policies affecting the intelligentsia, the workers and the peasants. 3 s.h. (w) *Kulski*

166. *Soviet Foreign Relations.* An analysis of relations between the Soviet Union and other states (Communist and non-Communist, Western and underdeveloped) as well as of the relations between the Communist Party of the Soviet Union with Communist parties in other countries. 3 s.h. (w) *Kulski*

180. *Comparative Government and Politics: Southern Asia I.* Concepts of political development in new states, using India, Pakistan, Ceylon and Malaya as case studies. Theory and practice of foreign aid and technical assistance as agents of political modernization. 3 s.h. (w) *Braibanti*

181. *Comparative Government and Politics: Southern Asia II.* The political modernization of India and Pakistan since 1947. Constitutional developments as revealed in leading court judgments will be studied. Other topics will be the ideology of administrative reform, formulation of state polity, rural development and party politics. 3 s.h. (w) *Braibanti*

182. *Comparative Government and Politics: Japan.* Although Chinese civilization will be studied as it relates to Japan, primary emphasis will be on the development of Japan's political system, starting with the Taikwa Reform and continuing to the present day. 3 s.h. (w) *Braibanti*

183. *Comparative Government and Politics: Southeast Asia.* An analysis of the development of government in Thailand, Vietnam, Burma, Malaya, Indonesia and the Philippines. Attention will be given to the Islamic, Buddhist and other indigenous cultures of these nations. 3 s.h. (w) *Kearney*

222. *Empirical Theory and Methodology.* The research process in political science in terms of the possibilities for the quantitative analysis

of data. Emphasis is on the construction of empirical theory, particularly conceptualization, hypothesis formation and testing. 3 s.h. (w) *Kornberg*

223. *Political Philosophy from Plato to Machiavelli.* Intensive analysis of the political philosophies of Plato and Aristotle, a survey of medieval political thought and an analysis of the significance of Machiavelli. 3 s.h. (w) *Hallowell*

224. *Modern Political Theory.* An historical survey and philosophical analysis of political theory from the beginning of the seventeenth to the middle of the nineteenth century. Attention is given to the rise of liberalism, the Age of Enlightenment, the romantic and conservative reaction, idealism and utilitarianism. 3 s.h. (w) *Hallowell*

225. *Comparative Government and Politics.* A comparative study of modern political institutions and processes, with particular attention to European constitutional government and politics. 3 s.h. (w) *Cole and Kulski*

226. *Comparative Government and Politics.* A comparative study of modern political institutions and processes, with particular attention to European totalitarian and authoritarian political systems. 3 s.h. (w) *Cole*

229. *Recent and Contemporary Political Theory.* The rise of positivism and its impact upon modern political thought, the origins of socialism, Marxism and its variants, socialism in the Soviet Union, nationalism, Fascism and National Socialism, the crisis in modern democracy, Christianity and the social order. 3 s.h. (w) *Hallowell*

231. *American Political Theory.* An analysis of the main currents in American political thought from colonial beginnings to the present day, with emphasis upon the development of liberalism in America. 3 s.h. (w) *Hallowell*

235. *The British Commonwealth.* An analysis of the political relationships between the members of the Commonwealth and a comparative study of the political systems of the Commonwealth countries, with particular reference to Canada. 3 s.h. (w) *Cole*

250. *Comparative Government and Politics: Southern Asia I.* Methodology of comparative political analysis. Institutional, functional, problematic and culture-analytic approaches compared. Theoretical problems of induced political and administrative change using India and Pakistan as case studies. 3 s.h. (w) *Braibanti*

251. *Comparative Government and Politics: Southern Asia II.* Political modernization of India and Pakistan emphasizing constitutional change, development of ideology, bureaucratic transition, party politics, law as an instrument of political change, and the community development movement. 3 s.h. (w) *Braibanti*

252. *Comparative Government and Politics: Japan.* A survey of the

civilization of Japan, and an analysis of political development from the Taikwa Reforms to the modern period. 3 s.h. (w) *Braibanti*

280. *Comparative Government and Politics: Sub-Saharan Africa.* Particular attention will be given to traditionalism and modernization, ideologies, leadership, party systems, the adaptation of parliamentary institutions, Africanization of the civil services, and the problem of political integration. 3 s.h. (w) *Proctor*

American Government and Public Administration

125. *American Political Parties and Practical Politics.* A study of the historical development, organization, and methods of political parties in the United States. 3 s.h. (w) *Simpson*

128. *The Judicial Process.* The judicial process and the role of the judiciary in the development of public policy in the United States. 3 s.h. (w) Open only to Juniors and Seniors. *Howard*

129. *Groups in American Politics.* A study of the composition, methods, and policies of organized groups as they participate in the creation of public opinion and in the formulation of public policy. Attention will be focused on recent national policy in the areas of agriculture, business, labor, education, welfare, foreign affairs, and on the roles that groups play in the formulation of these policies. 3 s.h. (w)

137. *Political Behavior in Elections.* The behavioral approach will be used to examine decision-making in the political process. Attention will be focused on the major factors that affect the outcome of elections, such as the characteristics of the American voter, the conduct of campaigns, the influence of propaganda and public relations techniques, and the influence of campaign finance. 3 s.h. (w)

138. *Political Behavior in Policy Making.* A study of the major factors that come into play in the making of governmental policy decisions. Special attention will be paid to the role of pressure groups and the methods of their lobbyist representatives, to the effects of pressures from constituents, and to the pressures of the executive and legislative branches upon each other. 3 s.h. (w)

141. *Public Administration.* An introduction to the role of administration in the governmental process considering principles of administrative organization, methods of administrative control, personnel and fiscal management. In general the study of the organizational and administrative problems encountered by any government agency charged with carrying out a public policy. 3 s.h. (w) *Hall*

142. *Administrative Responsibility.* An evaluation of political, legal and administrative methods of achieving a responsible bureaucracy in Ameri-

can national government. Comparisons will be made with relevant experience and techniques in other countries such as Great Britain and France. 3 s.h. (w) *Hall*

146. *Legislation.* A study of the composition and structures of legislative bodies and of the legislative process with attention to procedure, methods, techniques, delegation of discretion, and the use of controls. 3 s.h. (w) *Simpson*

161. *Government and Planning.* A study of the planning functions at all levels of government in the United States. Particular attention will be devoted to the problems posed for planning by metropolitan growth. 3 s.h. (w) *Leach*

164. *Government Regulatory Policy and Administration.* A consideration of selected regulatory policies of the American national government, such as anti-trust, transportation and communications, and of the administrative procedures and organizations designed to effect those policies. 3 s.h. (w) *Hall*

174. *Political Implications of Economic Legislation.* A study of political and sectional alignments in the passage of tariff, farm, railway, New Deal and other economic legislation. 3 s.h. (w) *Simpson*

199. *The Changing South.* (See Interdisciplinary Course 199.)

207. *American Constitutional Law and Theory.* A study of the leading principles of American government, as developed through judicial interpretation of the Constitution. 3 s.h. (w) *Rankin*

208. *American Constitutional Law and Current National Problems.* A study of the influence of recent Supreme Court decisions upon the political and constitutional development of the United States. 3 s.h. (w) *Rankin*

209. *Problems in State and Local Government in the United States.* A study of the historical development of state and local governments, their present organization and subdivisions, and their relation to each other. Special attention is given to the position of the states in the federal union through the study of federal-state, inter-state, and state-local relations. 3 s.h. (w) *Rankin and Leach*

211. *The Judicial Process.* A study of judicial decision-making in the United States, with emphasis on the process of litigation, the recruitment of judges, the influences and limits on judicial decisions, and their impact within the political system. Prerequisites: Political Science 127, 207 or their equivalents. Not open to students who have completed Political Science 128. 3 s.h. (w) *Howard*

230. *American Political Institutions.* A study of the formation and development of institutions of the national government in the United States, with historical and analytical treatment. Among other topics this course is concerned with the Constitutional Convention of 1787, and the

development of Congress, the Presidency, and the Supreme Court. 3 s.h.
(w) Rankin

234. *Civil-Military Relationships in American Government.* A consideration of the role of the military in American government both in theory and in practice. Special emphasis will be given to formal civil-military structural arrangements for determining policies, such as the National Security Council, and to the degree of civilian control within the military establishment. 3 s.h. (w) Connery and Dawson

241. *Administrative Management.* An advanced course in public administration with special attention being given to the development of scientific management, its application to government in the United States and a consideration of current problems in organization, procedures, work simplification, and management improvement. 3 s.h. (w) Connery and Hall

242. *National Administration.* A study of the administrative organization, working concepts and procedures of the United States Government, illustrated through the operations of the Bureau of the Budget. 3 s.h.
(w) Connery and Hall

244. *Administrative Law and Process.* The nature and law of the administrative process in the context of American government and politics, with special attention to the powers, procedures, and judicial control of administrative agencies. 3 s.h. (w) Hall

246. *Government Administration and Public Policy.* Through use of the laboratory and case study techniques, a consideration of the types of administrative problems that the United States Government encounters in the field of public policy, and their possible solution. 3 s.h. (w) Connery

275. *The National Party System.* An intensive examination of selected facets of American national political parties, such as: relationships between presidential and congressional politics, the politics of national conventions, recent foreign policy and party alignments, and the controversy over party government. 3 s.h. (w) Kornberg

276. *Comparative State Parties and Politics.* A selective analysis of party patterns in the states, including such topics as: classification schemes for state party systems, the impact of various nominating procedures on party organization, relationships between national and state politics, and the influence of party system on the operation of state government, with special attention to the South. 3 s.h. (w)

291. *Problems of Urban Government.* Analysis of problems in the structure and functions of urban governments in the United States 3 s.h.
(w) Leach

292. *Urban Administration.* A study of principles and methods relating to municipal administration in the United States. 3 s.h. (w) Leach

International Law and Relations

121. *Elements of International Relations.* The nature of international politics; the analysis of national power; the instruments of foreign policy; and the controls of state behavior. 3 s.h. (E & W) *Proctor; Lewis and Wagner*

122. *Modern International Politics.* An examination of the major problems of post-war international politics with particular attention to the extension of Soviet power, the Western response to this challenge, and the revolutions in the Afro-Asian world. 3 s.h. (E & W) *Proctor; Lewis and Wagner*

124. *The New States of Africa in World Affairs.* A study of the international political problems arising from the emergence of independent states in sub-Saharan Africa. 3 s.h. *Proctor*

158. *Control of American Foreign Policy.* A consideration of the forces which are responsible for the formulation of American foreign policy, and a study of the important factors which have influenced contemporary United States policy in the major areas of the world. The course includes an analysis of the respective roles of the President, Congress, Department of State, and the United Nations, as well as military and public opinion. 3 s.h. (W) *Ball*

221. *International Public Organization.* A study of the structure and functioning of the United Nations organs, or related specialized agencies such as the International Labor Organization, and of regional agencies such as the Organization of American States and the North Atlantic Treaty Organization. 3 s.h. (W) *Wilson and Ball*

227-228. *International Law.* Elements of international law, particularly as interpreted and applied by the United States; rights and duties of states with respect to recognition, state territory and jurisdiction, nationality, diplomatic and consular relations, treaties, treatment of aliens, pacific settlement of disputes, international regulation of the use of force, and collective responsibility. 6 s.h. (W) *Wilson*

Independent Reading and Undergraduate Seminar

191, 192. *Independent Study.* Directed reading and research. Open only to qualified Juniors by permission of the Director of Undergraduate Studies and of the individual instructor. 3-6 s.h. *Staff*

193, 194. *Independent Study.* Directed reading and research. Open only to qualified Seniors by permission of the Director of Undergraduate Studies and of the individual instructor. 3-6 s.h. *Staff*

197, 198. *Senior Seminar in Political Science.* A seminar concerned with the development, scope and research methods of political science. A major research paper is prepared by each student. Required of all politi-

cal science majors who are candidates for degree with distinction. Open only to Seniors. Prerequisite: Consent of the instructor. 6 s.h. (w)
Staff

Departmental Major

Prerequisite. Political Science 11-12 or 61-62.

Major Requirements. Eighteenth semester hours of work in the Department above courses 11-12 or 61-62, including at least nine semester hours of 200 courses.

Related Work. Eighteen hours in departments approved by the Political Science adviser, of which at least six hours must be taken in *each* of two departments and no more than six hours may be in courses primarily open to freshmen. Related work is usually taken in the departments of economics, history, philosophy, psychology and sociology and in Interdisciplinary Course 101, 102.

The Department offers work leading to graduation with distinction. See the section on Honors.

Portuguese

For courses in Portuguese, see *Romance Languages*, p. 168.

Psychology

Professor Alexander, *Chairman*; Professor Jones, *Director of Undergraduate Studies*; Professors Adams, Brehm, Dai, Diamond, Guttman, Kimble; Associate Professors Altrocchi, Banham, Boneau, Borstelmann, Carson, Erickson, Lakin, McHugh, Wallach, Wing; Research Associate Professor Gaffron; Assistant Professors Erickson, Kremen, Linder, Lockhead, Schiffman, Singer; Lecturers Botwinick, Cohen, E. Crovitz, H. Crovitz, Eisdorfer, Feather, Gehman, Huse, Krugman, Obrist, Peele, Shmavonian Somjen, Stedman, Thompson; Instructor Hinman

Psychology 91 or its equivalent is a prerequisite for all other courses in psychology. Six semester hours in psychology (including Psychology 91) or special permission of the course instructor or the Director of Undergraduate Studies are required for admission to all psychology courses over 140.

91. *Introductory Psychology.* An introduction to the facts, principles, and problems of psychology through a study of motivation, emotions, perception, sensation, thinking, memory, learning, social behavior, individual

differences, and personality. Offered both semesters. 3 s.h. (E & W) Staff

100. *Personality.* Representative theories of personality, from Freud to the present, emphasizing problems of normal personality structure, dynamics, development, and assessment. Not open to students who have had Psychology 116. 3 s.h. Alexander and Kremen

101. *Introductory Social Psychology.* Problems, concepts and methods in the study of social interaction and interpersonal influence. Topics include: Socialization; social factors in perception and learning; psychological principles underlying conformity; conditions affecting social interaction. 3 s.h. Jones and Linder

104. *Comparative Psychology.* An examination of the bearing upon general psychological theory of experimental investigations of animal behavior in the fields of motivation and learning. 3 s.h. (W) Adams

110. *Applied Psychology.* Applications of psychology to problems of personnel selection, industrial efficiency, advertising and selling, and other problems of practical interest. 3 s.h. (W) McHugh

111. *Advanced General Psychology.* A more intensive study of several selected problem areas in the field of general psychology with special emphasis on experimental methods and findings in the areas considered. 3 s.h. (W) Kimble

116. *Psychology of Adjustment.* Problems of adjustment and mental hygiene. Lectures and discussions cover an application of the principles and findings of normal and abnormal psychology, as these relate to the adjustment of the average individual in our changing society. Not open to students who have had Education 68 or Psychology 100. Open normally to nursing students and to others by permission of the instructor. 3 s.h. (W) E. Crovitz

117. *Statistical Methods in Psychology.* Elementary statistical techniques and their application to the analysis and interpretation of psychological data. Theory of inference is stressed. 3 s.h. (W) Staff

118. *Experimental Methods in Psychology.* The procedures and methods of human and animal experimentation in such areas as learning, motivation, and perception. 3 s.h. (E) Staff

121. *Child Psychology.* A survey of theory and research on growth and behavior from infancy to adolescence, with special emphasis upon personality and cognitive development. 3 s.h. (W) Borstelmann, McHugh and Singer

122. *Adjustment of the Pre-School Child.* Study and application of techniques of observing, recording and interpreting the behavior of the pre-school child. The course is designed to meet the needs of students interested in the personality, development and social adjustment of children. One hour lecture and 4 hours laboratory. 3 s.h. (E) Banham

126. *Adolescent Psychology.* The mental, social and emotional development of adolescence and youth will be studied with special attention given to such topics as interests, motivations, home problems, sex differences, recreation, delinquency, and development of citizenship. Prerequisite: Psychology 121 or Education 118, or permission of the instructor. 3 s.h. (w) *McHugh*

130. *Principles and Methods of Psychological Evaluation.* This is an introductory course in test methods used by psychologists in measuring and evaluating mental processes. The nature, purposes and utilization of various types of tests and psychological techniques will be discussed and demonstrated. Among the tests to be studied will be standard scales of intelligence; tests of special abilities, aptitudes, attitudes and interests; personality tests, rating scales and projective methods. Prerequisite: 6 s.h. in Psychology. 3 s.h. (w) *Banham*

132. *The Psychology of Individual Differences.* A study of the nature and causes of individual and group variations in intelligence, special abilities, social and emotional characteristics. These will be considered in relation to developmental sequence, aging factors, sex, race, biological inheritance, education and socio-economic conditions. Prerequisite: Psychology 130 or permission of instructor. 3 s.h. (w) *Banham and Wing*

141. *Personality and Behavior Disorder.* Behavior disorder studied from the viewpoint of the psychological principles underlying the adjustment of the deviant personality. Prerequisite: Psychology 100. 3 s.h. (w) *Altrocchi, Carson, Lakin and Singer*

142. *Instrumental Behavior.* A laboratory course using animal subjects in operant conditioning situations. Class members carry out a series of observations on conditioning, discrimination, motivation, and other basic phenomena. 3 s.h. (w) *Guttman*

144. *The Psychology of Learning.* A survey of the basic facts and principles of human and animal learning. Students in the course will perform an independent experiment. 3 s.h. (w) *Kimble and Boneau*

145. *Experimental Approaches to Personality.* Experimental methods applied to personality research with emphasis upon psychological studies in such areas as anxiety, conflict and frustration. Students will perform representative experiments. Prerequisite: Psychology 100 or permission of the instructor. 3 s.h. (w) *Wallach*

147. *Experimental Social Psychology.* Intensive consideration of selected problems in group dynamics, attitude change, and interpersonal perception. Current research and theory are stressed. Class members conduct individual research projects. Prerequisite: Psychology 101 or permission of the instructor. 3 s.h. (w) *Brehm and Jones*

148. *Psychology of Perception and Thinking.* A study of the basic phenomena of perception and thinking as determined by conditions in the external situation and in the person, biological and psychological. Stu-

dents will perform representative experiments. 3 s.h. (w) *H. Crovitz*

151. *Psychology and International Relations.* This course will explore the application of psychological theories to problems of international relations including those concerned with inter-group conflict and its resolution, group identification and ethnocentrism, and the complexities of national character. The course will be problem oriented and conducted on a seminar basis. Theoretical papers and experimentation along the lines of topics mentioned above will be expected. Prerequisites: Psychology 91, 100 or 101, and consent of the instructor. (w) *Lakin*

152. *Physiological Psychology.* Neural bases of behavior, sensory and motor functions of the nervous system, and problems of emotion, motivation, and consciousness. Laboratory in psychophysics and the electrical activity of the nervous system. Prerequisites: Physics 1-2 or Chemistry 1-2 or permission of instructor. 3 s.h. (Formerly Psychology 112.) *Erickson*

153. *Introduction to Biological Psychology.* Application of biological principles to psychology. Among the concepts considered are species, gene, homeostasis, internal environment, reflex, synapse, organ, and receptor specificity. Phylogeny of the cortex treated in detail. Prerequisite: Zoology 1-2 and Comparative Anatomy, or permission of the instructor. 3 s.h. (Formerly Psychology 108) *Diamond*

171, 172. *Junior Tutorial.* Small group discussions of influential books and articles in psychology. Prerequisites: 6 s.h. in psychology and permission of Director of Undergraduate Studies. 4 s.h. *Brehm and Staff*

173, 174. *Senior Tutorial.* Small group discussions of influential books and articles in psychology. Prerequisite: 12 s.h. in psychology and permission of Director of Undergraduate Studies. 4 s.h. *Brehm and Staff*

175, 176. *Independent Research.* Independent investigation of topics of special interest. Admission requires formulation of a study plan with a faculty supervisor and approval of the Director of Undergraduate Studies. Prerequisite: 9 s.h. of Psychology. 6-12 s.h. *Brehm and Staff*

191, 192. *Independent Study and Research—I.* Directed reading and research. Open only to highly qualified students in the junior year, by permission of the department. See page 56. 6 s.h. *Brehm and Staff*

193, 194. *Independent Study and Research—II.* Directed reading and research. Open only to highly qualified students in the senior year, by permission of the department. See page 56. 6-12 s.h. *Brehm and Staff*

The following courses are open to selected undergraduates with permission of the instructor:

203. *Psychology of Perception.* An examination of current systematic formulations with emphasis upon the intensive analysis of a variety of representative investigations. 3 s.h. *Lockhead*

204. *Comparative Psychology.* The study of behavior as related to

species and of speciation as dependent upon behavior; instinct, imprinting and learning at different phylogenetic levels. 3 s.h. *Adams*

210. *Cognition and Higher Mental Processes.* An intensive analysis of the literature on thinking, problem solving, creativity, language, and related topics. Emphasis is upon the functional significance of these aspects of intellectual activity and upon the experimental methodology involved in their study. 3 s.h. *Boneau*

213, 214. *Conditioning and Learning.* A survey of the literature on classical and instrumental conditioning and other forms of simple learning. Emphasis is on classical conditioning in 213 and on instrumental behavior in 214. 6 s.h. *Kimble and Guttman*

215. *Developmental Psychology.* A consideration of selected research areas in child behavior and development, including personality, cognition, perception and learning. Prerequisite: special permission of the instructor. 3 s.h. *Borstelmann*

216. *Biological Psychology.* The methods of biology (as applied to psychology), especially in neurophysiology, neuroanatomy, and genetics. Topics covered include: (a) the genetics of behavior, (b) the organization of the dorsal thalamus and neocortex, (c) the limbic system and hypothalamus. Methods covered include: (a) ablation method, (b) method of evoked potential, (c) electrical stimulation of the brain, (d) classical and physiological genetics. 3 s.h. *Diamond*

217. *Research Methods in Social Psychology.* Presents the theory and practice of data collection methods in social psychology. Emphasis is on the interplay between design and technique. The methods covered include formal scaling procedures, systematic observational techniques and others appropriate to field studies, field experiments, surveys and laboratory experiments. 3 s.h. *Brehm*

218. *Social Psychology.* An examination of selected problem areas in social psychology including social factors in cognition, models of social interaction, conformity and social influence, and attitude development and change. Recent research is emphasized in relation to its historical context and its bearing on the development of theory. 3 s.h. *Jones*

220. *Physiological Bases of Behavior.* Classical studies on the neuropsychology of learning and behaviors such as hunger, thirst and sex. The central role of neuroendocrinology in the physiological bases of motivated behavior. 3 s.h. *Staff*

225. *Personality and Experimental Dynamics.* Application of experimental methods to the study of psychodynamics, personality development and behavior pathology. Stress is on research in early experience and its influence on personality, frustration, conflict, anxiety, and the mechanisms of defense and adaptation. 3 s.h. *Staff*

234. *Seminar in Personality.* Selected research topics of current interest

in experimental study of personality, including risk-taking, creativity, and cognitive styles. 3 s.h. *Wallach*

236. *Theoretical Psychology.* Survey of representative systematic formulations and schools in historical sequence. Study of relationships between various philosophical, scientific, and cultural thought-patterns and the forms of psychological theories. 3 s.h. *Guttman*

237. *Functional Neurophysiology.* Considers the mechanisms of activity of the individual neuron and groups of nerve cells, the principles of activity of the afferent and efferent neural systems, and the integrative and associative functions of the nervous systems. Laboratory demonstrations and participation. Permission of the instructor. 3 s.h. *Erickson*

238. *The Electroencephalogram and Psychological Function.* A survey of experimental and clinical literature on brain wave correlates of intelligence, personality, behavior disorders, epilepsy, sleep, sensory stimulation, reaction time, and attention. Special emphasis is placed on the electrophysiology of conditioning and learning. Lectures, laboratory demonstrations and clinical case presentations. 3 s.h. *Obrist*

239. *Behavioral Correlates of Brain Damage in Man.* Effects of brain damage on psychological functioning. Known brain-behavior relationships and problems encountered in the study of brain function. Laboratory demonstrations for assessment of cerebral dysfunction through the use of standard psychological tests. 3 s.h. *Thompson*

245, 246. *Personality Theory and Assessment.* An examination of representative models of human functioning from Freud to the present day. Included are examples from psychoanalytical, field theoretical and behavioristic approaches. Laboratory sessions will be concerned with personality assessment of normal human subjects over time. Interview and testing procedures will be introduced and the data gathered assessed against the theoretical models studied. 6 s.h. *Alexander, Kremen, and Schiffman*

265. *Fundamental Statistical Applications in Psychological Research.* Introduction to probability and the use of statistics in description and hypothesis testing in psychology including the following applications: correlational techniques, chi-square and t tests, distribution-free tests and one-way analysis of variance. Prerequisite: Psychology 117-118 or equivalent. 3 s.h. *Boneau*

266. *Advanced Statistical Applications in Psychological Research.* The basic theory and application of analysis of variance techniques to complex experimental designs will be covered. Additional advanced techniques, including factor analysis, will be introduced. Prerequisite: Psychology 265 or equivalent. 3 s.h. *Boneau*

292. *History of Psychology.* The history of psychology, particularly in the experimental period of the past century and of its involvement in biology since Darwin. 3 s.h. *Adams*

Departmental Major

Prerequisite. Psychology 91 or equivalent.

Major Requirements. 24 semester hours in psychology, including Psychology 91, 117, and a minimum of two courses numbered above 140.

Related Work. 18 semester hours which may include certain courses in chemistry, economics, education, English, linguistics, mathematics, philosophy, physics, political science, sociology-anthropology and zoology for the A.B. degree. For the B.S. degree, all 18 s.h. must be in the natural sciences.

Religion

Associate Professor Langford, *Chairman*; Associate Professor Phillips, *Director of Undergraduate Studies*; Assistant Professor McCollough, *Supervisor of Freshman Instruction*; Professor Price; Associate Professors Bradley, Jones, Osborn, Poteat, and Sullivan; Assistant Professors Daniels, Fousek, Partin, and Wintermute; Instructors Cresson, Eakin, Kort, and Ricketts

The purpose of the undergraduate program of instruction in religion is to engage the student in a study of religion, its nature and historical manifestations. Since the Judaeo-Christian tradition is the dominant religious influence in the history of Western culture, an historical-critical examination of its primary sources, Old and New Testaments, is the basis of the required study in religion.

The department sees its task as integral to that of a liberal education. The inclusion of the study of religion in the university recognizes the integrity of the subject matter and its essential relation to the other humanities. It serves the cause of humanistic education furthermore by keeping alive fundamental and ultimate questions which are inherent in its subject matter and which can be engaged responsibly in the academic study of religion.

Students who have fulfilled the uniform course requirement in religion may take only courses numbered 100 and above.

1-2. *The English Bible.* A comprehensive survey of the books of the Old and New Testaments. The literature is examined in the light of its origin in the history and religion of the people of the Bible, in order that its theological significance in its own day and in ours may be understood. Open only to freshmen. 6 s.h. *Staff*

43, 44. *Tutorial.* See description of Religion 1-2 which must accompany the Tutorial. 1 s.h. each semester. *Staff*

51-52. *The English Bible.* A survey of the Old and New Testaments,

similar to Religion 1-2 but adapted to the capabilities of sophomores, juniors, and seniors. Not open to freshmen, or to students who have received credit for Religion 1-2. 6 s.h. *Staff*

55. *The Religion of the Bible.* An introduction to the historical and critical study of the Old and New Testaments, which considers the principal persons, events, ideas, and practices contained in the Biblical record, and their significance for the present time. Not open to freshmen, or to students who have received credit for Religion 1-2 or 51-52. 3 s.h. *Staff*

65. *Jesus: The Man and His Message.* A detailed examination of the Gospel records, for the purpose of recovering the person and mission of Jesus. Attention will be given to conceptions of Christ in the history of the Church, and to his contemporary significance. Prerequisite: Religion 55. Not open to students who have completed the uniform course requirements in religion. See Religion 121. 3 s.h.

85. *Introduction to Christian Ethics.* An analysis of the Biblical and theological bases for an understanding of man's moral situation, with a study of the social implications of Christianity in selected problem areas. Prerequisite: Religion 55. Not open to students who have completed the uniform course requirements in religion. See Religion 152. 3 s.h. *McCollough*

93. *Survey of the World's Living Religions.* An introductory course designed to acquaint the student with the problems and methods of the study of world religions. After a brief consideration of religion in primitive culture, the world's living religions are dealt with in terms of historical development and the beliefs, practices, and contemporary importance of each. Prerequisite: Religion 55. Not open to students who have completed the uniform course requirements in religion. See Religion 175. 3 s.h. *Bradley, Partin, Ricketts, Sullivan*

100. *Principles of Investigation.* An introduction to the resources and methods appropriate to advanced study in Religion. Required of all majors; open to others. 1 s.h. *Wintermute*

111. *The Prophets of the Old Testament.* A study of the origin and rise of the prophetic movements, the message of the prophets in their historical setting, the contributions of this movement to the Biblical view of God and history, and the significance of the prophets for today. 3 s.h. *Wintermute*

121. *The Mission and Message of Jesus.* An analysis and interpretation of the Gospels, designed to afford the student a fuller understanding of Jesus and his mission. Not open to students who have received credit for Religion 65. 3 s.h. *Daniels and Price*

123. *The Life and Letters of Paul.* A study of the available sources for the life of Paul, his role in the expansion of the Christian movement, the

most important aspects of his thought, and his continuing influence. 3 s.h.
Daniels

131, 132. *History of the Christian Church Through the Reformation.* A study of the crucial events, issues, forms, and writings that have shaped the Christian community and civilization from the time of the early Church to the beginnings of the modern Church, intended to orient the student in the heritage and foundations of the Christian Church and of Western society. The first semester will deal with the ancient Church through the sixth century; the second semester with the medieval and Reformation developments. 3 s.h. each semester. *Fousek*

133. *History of Christianity Since the Reformation.* A study of events, trends, personalities, and interpretations which have shaped Christianity since the Reformation, with emphasis upon those which contribute to an understanding of the contemporary religious situation. 3 s.h.

135. *The Correspondence of the Great Fathers of the Church.* A seminar in theological discussions, personalities, issues of the day, in the context of later Roman society, seen through the letters of the Fathers from Athanasius to Gregory the Great. Prerequisite: Religion 131, or permission of instructor. 3 s.h. *Fousek*

137. *Christianity in America.* A study of representative men, movements, and thought in American Christianity to 1918. 3 s.h. *Jones*

138. *Contemporary Religions in the United States.* Judaism, Catholicism, and Protestantism are studied with reference to their distinctive beliefs and practices. A comparison is made of common and dissimilar features. 3 s.h. *Phillips*

140. *Christian Beliefs.* An introductory study of important Christian teachings concerning God, Jesus Christ, sin and salvation, etc., intended to serve as a basis for the student's evaluation of his own religious concepts. 3 s.h. *Langford and McCollough*

144. *Problems of Religious Thought.* A study of the relation of belief in God to various other types of knowledge and experience, such as the research of natural and social scientists and the facts of suffering, human tragedy, and evil. 3 s.h. *Langford and Poteat*

149. *Current Interpretations of Christianity.* Contemporary types of Christian thought as seen through the writings of such leading representatives as Karl Barth, John Baillie, Paul Tillich, and Reinhold Niebuhr. 3 s.h. *Osborn*

152. *Christian Ethics.* A systematic study of the ethical implications of Biblical religion. Attention is given both to the historical development of the Christian ethic and to the responsibility of the Christian in the various aspects of contemporary social life, such as marriage, the state, race, etc. Not open to students who have received credit for Religion 85. 3 s.h. *McCollough*

156. *Christian Marriage and the Family.* Marriage and the family in

American society studied from the Christian perspective. Attention will be given to the teachings of the churches and of psychologists and sociologists concerning courtship and marriage, sex, parent-child relationships, mixed marriages, and divorce. 3 s.h. *Phillips*

160. *Christian Education.* A study of the educational work of the Church, with emphasis upon the philosophy, objectives and functions of Christian education. 3 s.h. *Daniels*

171. *Religions of the Ancient Near East.* The history and literature of religions in the cultures of Egypt, Mesopotamia, Persia, and Palestine from earliest times to 600 B.C. 3 s.h. *Wintermute*

172. *Religious Quests of the Greco-Roman World.* The religious movements in the Hellenistic age, including sectarian Judaism, Persian dualism, the mystery cults, and Gnosticism. 3 s.h. *Wintermute*

175. *Non-Christian Religions of the Modern World.* An examination of the beliefs of Islam and the religions of India, China, and Japan. Emphasis will be placed upon the sacred literature, world view, history, and cultural and social significance of the principal non-Christian religions. Not open to students who have received credit for Religion 93. 3 s.h. *Bradley, Sullivan, and Partin*

176. *World Religions and Social Change.* Religious traditions and institutions in national and international affairs. Intensive study of selected areas of Asia and Africa with special stress on missionary religions and political change. 3 s.h. *Bradley*

178. *Myth and Symbol.* Historical and phenomenological study of religious myth and symbol, Christian and non-Christian. The nature and function of myth in religion; types of myths, with particular attention to cosmogonic myths. The nature of religious symbols; structural and comparative study of selected symbols. 3 s.h. *Partin*

179. *Mysticism: Sacred and Profane.* Varieties of mystical experience, both religious and non-religious; representative mystics in Hinduism, Islam, Christianity, and Mahayana Buddhism; the nature and significance of mysticism within these traditions. Prerequisite: Religion 93 or 175. 3 s.h. *Sullivan*

187. *Religious Values in Classical and European Literature.* A consideration of the religious insights, explicit and implied, in representative writings. 3 s.h. *Kort*

189. *Man in Modern Prophetic Thought.* The individual and society in the writings of Kierkegaard, Nietzsche, and Berdyaev. 3 s.h. *McCollough*

191, 192. *Independent Study.* Directed reading and research. Open only to highly qualified students in the junior year, by permission of the department. 6 s.h. See page 56.

193, 194. *Independent Study.* Directed reading and research. Open

only to highly qualified students in the senior year, by permission of the department. 6-12 s.h. See page 56.

195-196. Honors Research. The first semester is a seminar in which methods of research are applied to selected problems in religion; in the second semester, independent research projects are reported to the class, and eventuate in research papers. Normally taken in the junior year. 6 s.h. *Staff*

Senior Seminars

The following seminars parallel the five categories of courses offered in the department. They afford opportunities for more intensive reading and individual research. Each major must take one of these courses in his senior year; they are open also to qualified non-majors. To be eligible for a seminar the student (major or non-major) must have completed at least one course in this area or pass the qualifying examination on the departmental reading list in that category. Each seminar will be offered as frequently as student demand and available personnel permit.

199. (*See University Course*).

203. Biblical Studies. 3 s.h.

204. Church History. 3 s.h.

205. Theology and Ethics. 3 s.h.

206. Christianity and Culture. 3 s.h.

207. History of Religions. 3 s.h.

210. Contemporary British Theology. Selected problems in representative British theological writings after 1920. Prerequisite: permission of the instructor. 3 s.h. *Langford*

228. The Theology of the Gospel and the Epistles of John. A study of the origin of these writings, the provenance of their thought forms and symbolism, their influence on the early Church, and their contemporary significance. Prerequisite: permission of the instructor. 3 s.h. *Price*

248. The Theology of Karl Barth. An historical and critical study of the theology of Karl Barth. Prerequisite: permission of the instructor. 3 s.h. *Osborn*

279. Religions of East Asia. Major traditions of China and Japan with emphasis upon the development and expansion of Buddhism. Prerequisite: permission of the instructor. 3 s.h. *Sullivan*

285. Origins of Indian Civilization. A study of the main sources and traditions of the classical civilization of the Indian subcontinent with particular attention to religious movements and institutions. (Also listed as History 285.) Prerequisite: permission of the instructor. 3 s.h. *Sullivan*

Departmental Major

Prerequisite. Completion of the uniform course requirement in religion. (The sequence Religion 1-2 or 51-52 is recommended.)

Major Requirements. Twenty-five semester hours selected as follows:

1. Religion 100 (to be taken in the semester after becoming a major).
2. Three hours from each of the following categories: (A major may fulfil, without credit, the requirement in any one of these areas by passing the departmental examination of the basic book list for that category).
 - (a) Biblical studies: 111, 121, 123, 228
 - (b) Church history: 131, 132, 133, 137, 138
 - (c) Theology and ethics: 140, 149, 152, 156, 210, 248
 - (d) Christianity and culture: 144, 187, 189
 - (e) History of religions: 171, 172, 175, 176, 178, 279
3. A three hour senior seminar in one of the five categories.
4. At least six hours elected from the departmental curriculum.

Related Work. Eighteen semester hours, including a minimum of six hours in each of two departments. There is no restriction in principle as to departments in which related work may be taken. The departmental major adviser will take into consideration the vocational objective of the student and the need to select courses which will strengthen his major work.

The Department offers work leading to graduation with distinction which is normally begun in the junior year. See the section on graduation with distinction in this *Bulletin*.

Romance Languages

Professor Fein, *Chairman*; Associate Professor Grant, *Director of Undergraduate Studies in French*; Professor Davis, *Director of Undergraduate Studies in Spanish*; Assistant Professor Barlow, *Supervisor of Freshman Instruction in French*; Associate Professor Torre, *Supervisor of Freshman Instruction in Spanish*; Professors Castellano, Cherpack, Dow, Fowlie, Predmore, and Wardropper; Associate Professors Bush, Cordle, Tétel, Vincent; Assistant Professors Castellano, Dow, Hull, Miller, Périvier, Ripley, and ter Horst; Instructors Bryan, Daniel, Hogsett, and Tate; Arculin, Balentine, Battle, Beron, Goode, Hahn, O'Keefe, Stamelman, Terry, Upchurch, and Vines

French 63-64 and Spanish 63-64 are the prerequisites for all elective courses. Students who, by reason of foreign residence, have had special opportunities in French or Spanish must be classified by the Director of Undergraduate Studies.

French

1-2. Elementary French. Introduction to understanding, speaking, reading, and writing French. Audio-lingual techniques are combined with required recording-listening practice in the language laboratory. 8 s.h. (E & W) *Hull and Staff*

63-64. Intermediate French. Intensive classroom and laboratory practice in spoken and written patterns. Readings in contemporary literature. Prerequisite: French 1-2 or placement test. 8 s.h. (E & W) *Vincent and Staff*

91, 92. Introduction to French Literature. An introduction to the major writers of the French literary tradition. Selections and complete works of poetry, fiction, theater, and essay. In the first semester: Middle Ages through the 18th century. In the second semester: 19th and 20th centuries. Lectures and discussions; short essays and tests. Conducted in French. Prerequisite: French 63-64 or equivalent. 6 s.h. (E & W) *Cordle and Staff*

97. Spoken French. Intensive instruction in the spoken language: contemporary French prose provides the basis for vocabulary building, and for practice in structural patterns. Does not satisfy the minimum uniform requirement. Limited to 15 students. Prerequisite: French 64. 3 s.h. (E) *Dow and Staff*

104. The Sixteenth Century. An introduction to the spirit of the French Renaissance as reflected in the literature of the age of Rabelais and Montaigne, Ronsard and Du Bellay. 3 s.h. (E) *Vincent*

105. Explication De Textes. A study of the French method of textual analysis, with selections primarily from the 19th and 20th century authors. For students who have taken 91 and 92. 3 s.h. *Fowlie*

106. The Worlds of Rousseau. Studies of Rousseau's conception of the real world (the *Discours*), the ideal world (*Émile and the Contrat Social*), the fictional world (*La Nouvelle Héloïse*), and his personal world (the *Confessions and the Réveries*). 3 s.h. (E) *Cherpack*

107. The Worlds of Voltaire. Studies of Voltaire's conception of the real world (historical, philosophical, and satirical writings), his aesthetic world (poetry, drama, criticism), and his personal world (correspondence). 3 s.h. (E) *Cherpack*

108. French Romanticism. The beginnings of the modern era, in its quest for new values and a new expression, as studied through the great lyric poets and prosodists of the first half of the nineteenth century. Readings from Chateaubriand, Lamartine, Musset, Hugo, Vigny and others. 3 s.h. (E) *Grant and Ripley*

109. Toward Modernism in French Poetry. An introduction to modern trends in the nineteenth century: emergence from traditional Romanticism; Art for Art's Sake and the Parnassians (Gautier, Leconte de Lisle);

the transition from Decadence to Symbolism (Baudelaire, Verlaine, Rimbaud, and Mallarmé). 3 s.h. (E) *Barlow*

111. *French Drama of the Nineteenth Century.* A survey of the French theatre from the Romantic period to the *Théâtre libre*. 3 s.h. (E) *Dow*

112. *French Drama of the Twentieth Century.* Reading of representative plays selected from the works of Bernstein, Maeterlinck, Rostand, Sarment, Vildrac, J.-J. Bernard, Claudel, Lenormand, Pagnol, Giraudoux, Anouilh, and others. 3 s.h. (E) *Dow*

113. *The Seventeenth Century.* The search for man and for form; with special emphasis on the theater and the moralists. 3 s.h. (E) *Périvier*.

115. *The Nineteenth Century Novel.* Intensive study of selected novels from the works of Stendhal, Balzac, Flaubert, and Zola. Not open to students taking French 221 or 222. 3 s.h. (E) *Grant*

127, 128. *Advanced Composition and Conversation.* During the first semester elements of syntax are briefly reviewed, along with constant drill in the conversational idiom. In the second semester, there are exercises in free composition with intensified treatment of pronunciation and diction. Prerequisite: 97 or consent of instructor. 6 s.h. (E) *Mrs. Bryan, Mrs. Dow, Tétel, and Vincent*

134. *Contemporary French Life and Thought.* An introduction to the essential currents in French thought since 1895. Representative literary works are used as a basis for analysis and discussion of the contemporary scene. 3 s.h. (w) *Cordle and Bush*

191, 192. *Independent Study.* Directed reading and research. Open only to highly qualified juniors by permission of the Department. See page 56. 6 s.h.

193, 194. *Independent Study.* Directed reading and research. Open only to highly qualified seniors by permission of the Department. See page 56. 6 s.h.

209. *Advanced Composition and Syntax.* A detailed study of the morphological and syntactic structure of the French language; practice in writing various styles of French; vocabulary study. 3 s.h. (w) *Hull*

210. *French Phonetics.* The phonemic structure of contemporary French. Sounds, intonation. Practice in transcription. Remedial pronunciation drills. Readings on current phonological theory, especially as applied to French. 3 s.h. (w) *Hull*

213. *French Literature of the Seventeenth Century.* Its initial phase. Readings in the major literary works to the middle of the century. 3 s.h. (w) *Cherpack*

214. *French Literature of the Seventeenth Century.* Its "classical" phase. Readings in the major literary works from the middle to the end of the century. 3 s.h. (w) *Cherpack*

217. *Mallarmé and Rimbaud.* The symbolism and the formal elements

of Mallarmé's poetry. The poetic theory and the psychic elements in Rimbaud's poetry. 3 s.h. *Fowlie*

219. *Old French Literature.* An introduction to the reading of medieval French literary texts. 3 s.h. (w) *Vincent*

221. *The Nineteenth Century French Novel.* The initial phase. The Romantic hero in conflict with society, with special emphasis on the works of Stendhal and Balzac. 3 s.h. (w) *Grant*

222. *The Nineteenth Century French Novel.* A continuation of 221. The decline of the individual hero. Flaubert and Zola will receive intensive study. 3 s.h. (w) *Grant*

223. *French Literary Criticism.* A history of critical theory in France and a study of the major critics from the Renaissance to today. 3 s.h. *Fowlie*

225, 226. *From Renaissance to Baroque in French Literature of the Sixteenth Century.* First semester: literary prose. Readings from Jean Lemaire de Belges, Marguerite de Navarre, Rabelais, Montaigne, and others. Second semester: poetry and theater. Readings from Marot, Scève, Labé, Saint Gelais, the Pléiade, d'Aubigné, Sponde, Du Bartas, Garnier, and others. 6 s.h. (w) *Tétel*

228. *French Poetry of the Twentieth Century.* In the wake of symbolism: Valéry and Claudel; poetry as ritual: Péguy; Apollinaire and surrealist poetry; the contemporary movement: Michaux, Char, Saint-John Perse. 3 s.h. *Fowlie*

229. *The Limits of Romanticism.* A critical study of the end of an epoch as shown in the works of Barbey D'Aureville, Villiers de l'Isle-Adam and Huysmans. 3 s.h. (w) *Bush*

233. *Contemporary French Theatre.* A study of dramatic theory; the art of the leading directors; and the major texts of Claudel, Giraudoux, Anouilh, Sartre, Beckett, Ionesco, Genet, etc. 3 s.h. *Fowlie*

234. *Proust.* A study of *A la recherche du temps perdu*. The thematic structure and the aesthetics of the work. This course is designed for graduates, but may be taken by qualified seniors and by a limited number of juniors with the permission of the instructor. 3 s.h. *Fowlie*

236. *Baudelaire.* A study of the poetry and criticism of Baudelaire as contributing to the origins of modern art and literature. 3 s.h. (w) *Fowlie*

241, 242. *French Literature and Thought in the Age of Enlightenment.* First semester: The new philosophy and its propagation. Lectures and discussions involving texts by Fontenelle, Montesquieu, Voltaire, Rousseau, Diderot, and others. Second semester: the crisis in literary aesthetics. Readings, lectures, and discussions bearing on the clash between Classicism and new literary orientations. 6 s.h. (w) *Cherpack*

245. *French Literature of the Twentieth Century.* To 1935. Emphasis on Gide, Mauriac, and Malraux. 3 s.h. (w) *Cordle*

246. *French Literature of the Twentieth Century*. After 1935. Emphasis on Sartre, Camus, and the *nouveau roman*. 3 s.h. (w) Cordle
248. *French Literature of the Twentieth Century*. Three Modern Prophets. Extensive readings from Bloy, Bernanos, Péguy. 3 s.h. (E) Bush

Italian

- 181-182. *Italian*. Intensive introduction to the language. Modern readings. Completion of the second college year of another foreign language will normally be required as a prerequisite. 6 s.h. (E) Tétel
288. *The Renaissance*. Petrarch, Boccaccio and Ariosto. 3 s.h. (w) Tétel

Portuguese

- 181-182. *Portuguese*. Intensive introduction to the language. Modern readings. Completion of the second year of another foreign language will normally be required as a prerequisite. 6 s.h. (w) Miller
- 185, 186. *Conversation*. Intensive practice in spoken Brazilian Portuguese. Prerequisite: Portuguese 181-182 or permission of the instructor. 1 s.h. (w) Miller

Spanish

- 1-2. *Elementary Spanish*. Introduction to understanding, speaking, reading, and writing Spanish. Audio-lingual techniques are combined with required recording-listening practice in the language laboratory. 8 s.h. (E & w) Miller and Staff
- 63-64. *Intermediate Spanish*. Intensive classroom and laboratory practice in spoken and written patterns. Readings in contemporary literature. Prerequisite: Spanish 1-2 or placement test. 8 s.h. (E & w) Castellano and Staff
- 91, 92. *Introduction to Spanish Literature*. An introduction to the major writers of the Spanish literary tradition. Selections and complete works of poetry, fiction, theater, and essay. In the first semester: Middle Ages through the 18th centuries. In the second semester: 19th and 20th centuries. Lectures and discussions; short essays and tests. Conducted in Spanish. Prerequisite: Spanish 63-64 or equivalent. 6 s.h. ter Horst and Staff
97. *Spoken Spanish*. Intensive instruction in the spoken language: contemporary Spanish prose provides the basis for vocabulary building, and for practice in structural patterns. Does not satisfy the minimum uniform requirement. Limited to 15 students. Prerequisite: Spanish 64. 3 s.h. (E) Predmore, Fein, Miller, and Torre

156. *Representative Writers of Spanish American Literature.* Study of works which are examples of the principal literary currents after 1880. 3 s.h. (w) *Fein*

161. *Spanish Literature of the Renaissance and the Baroque.* A study of selected works of the sixteenth and seventeenth centuries with attention to their reflection of social, religious, and political ideas. 3 s.h. (E) *Miller and Ter Horst*

162. *Spanish Romanticism.* A study of the romantic spirit in modern Spanish literature. 3 s.h. (E) *Torre*

163. *The Generation of 1898.* A study of the "Spirit of 1898" with special emphasis on the novel and essay. The precursors: "Clarín" and Gánivet; Unamuno, Baroja, "Azorín," Valle-Inclán; influence on the next generation: Pérez de Ayala and Ortega y Gasset. 3 s.h. (E)

165. *Analysis of Great Spanish Authors.* A close textual study of a few literary texts with some considerations of methods of literary criticism. The course is designed to give the student insight into various ways of interpreting and understanding literary works so that his experience of literature in general may be enriched. 3 s.h. (E) *Wardropper*

166. *Spanish Realism.* The growth of realism in Spanish literature of the nineteenth century. 3 s.h. (w) *Davis*

176. *Advanced Conversation.* This course is designed to develop facility of expression through constant drill on vocabulary and conversational idiom. Time will be devoted to a review of the essentials of Spanish syntax. Prerequisite: Spanish 97 or permission of the instructor. 3 s.h. (E) *Castellano*

191, 192. *Independent Study.* Directed reading and research. Open only to highly qualified juniors by permission of the Department. See page 56. 6 s.h.

193, 194. *Independent Study.* Directed reading and research. Open only to highly qualified seniors by permission of the Department. See page 56. 6 s.h.

251. *The Origins of the Spanish Novel.* A critical study, based on close readings and discussions, of selected examples of the principal genres of the early novel: *Amadis de Gaula*, Diego de San Pedro's *La cárcel de amor*, the *Abencerraje*, the *Lazarillo*, Montemayor's *Diana*. 3 s.h. (w) *Wardropper*

252. *Spanish Lyric Poetry Before 1700.* A critical study, based on close reading and discussion, of selected poems of the Middle Ages, Renaissance and Baroque. Special emphasis on the *Razón de amor*, *la poesía de tipo tradicional*, and Santillana; on Garcilaso, San Juan de la Cruz, Fray Luis de León, and Herrera; on Góngora and Quevedo. 3 s.h. (w) *Wardropper*

253. *The Origins of the Spanish Theater.* A study of the evolution of the Spanish theater from the *Auto de los Reyes Magos* (12th century)

through the end of the 16th century. The idea of the theater as dramatic poetry will be stressed; close reading of texts by Gómez Manrique, Encina, Gil Vicente, Torres, Naharro, Lope de Rueda, Juan de la Cueva. 3 s.h. (w) *Wardropper*

255. *Modern Latin American Literature.* The coming of age of Latin American literature in the nineteenth and twentieth centuries, with particular attention to the Modernist movement. 3 s.h. (w) *Fein*

256. *Contemporary Latin American Literature.* Trends in Latin American literature after the Modernist movement. Analysis of significant works in various genres. 3 s.h. (w) *Fein*

258. *Old Spanish Literature.* An introduction to the reading of medieval Spanish literary texts. 3 s.h. (w) *Davis*

259. *Spanish Phonetics.* A phonemic approach to the study of Spanish sounds. Remedial pronunciation drills with special emphasis on rhythm and intonation. Readings in current studies of phonology. Prerequisite: Spanish 176 or permission. 3 s.h. (E) *Castellano*

260. *Advanced Composition and Syntax.* Study of fundamental difficulties in the language; practice in writing idiomatic Spanish; exercises in free composition. For students who have a satisfactory command of Spanish grammar and fair conversational ability. Prerequisites: Spanish 176 or permission. 3 s.h. (E) *Castellano*

261. *Nineteenth Century Novel.* A study of literary trends in the last half of the nineteenth century. Readings will be selected from the novels of Valera, Pereda, Galdós, Pardo Bazán, Blasco Ibáñez, and their contemporaries. 3 s.h. (w) *Davis*

264. *Modern and Contemporary Spanish Theatre.* A brief review of the modern and contemporary Spanish theatre from the period of Romanticism. Lectures, reading, and discussion of the most representative works of Benavente, Martínez Sierra, los hermanos Quintero, etc. 3 s.h. (E) *Castellano*

265. *Golden Age Literature: Cervantes.* The life and thought of Cervantes with special emphasis on his *Quijote*. 3 s.h. (w) *Predmore*

266. *Golden Age Literature: The Drama.* A study of the chief Spanish dramatists of the seventeenth century with readings of representative plays of this period. 3 s.h. (w) *Castellano*

275. *Contemporary Spanish Literature: Essay and Lyric Poetry.* A study of the revision of national values and literary expression in the twentieth century with particular reference to the crisis of 1898 and to the enrichment of the Spanish tradition through extrapeninsular influences. 3 s.h. (w) *Predmore*

276. *Contemporary Spanish Literature: Novel.* A study of tradition and innovation in the twentieth century Spanish novel with emphasis on the novels of Unamuno, Baroja, Valle Inclán, and Pérez de Ayala. 3 s.h. (w) *Predmore*

Romance Languages

RL 211. *Approaches to Romance Literature.* An introduction to the most significant ways in which Romance Literature has been divided and studied, with analyses of selected texts. 3 s.h. (w) *Cherpack*

RL 218. *The Teaching of Romance Languages.* Evaluation of objectives and methods; a study of the practical problems involved in teaching these languages on the elementary, secondary, and college level; analysis of textbooks, special foreign language programs, audio-visual aids; critical examination of modern techniques in written and oral testing. 3 s.h. (E) *Dow*

RL 224. *Romance Linguistics.* The origin and development of the Romance languages from spoken Latin to the modern standard languages and local dialects. Introduction to the structural method as applied to historical and comparative linguistics. Prerequisite: French 219, Spanish 258, or permission of instructor. 3 s.h. (w) *Hull*

Departmental Major

Prerequisites. French or Spanish: 63-64 or equivalent.

Major Requirements. For French: 97; 127 or 128; 209 or 210; and a minimum of 15 hours of courses in literature selected from 91 and above including six hours above 200. All majors must take one of the following: 113, 213, 214. For Spanish: 97; 176; 259 or 260; and a minimum of 15 hours of courses in literature selected from 91 and above including six hours above 200. All majors must take one of the following: 161, 251, 252, 253, 265, 266.

The Department offers work in the junior and senior years leading to graduation with distinction. See the section on Honors in this *Bulletin*.

Related Work. Majors in Romance Languages will select, with approval of the Director of Undergraduate Studies, appropriate courses from the following fields: (1) other languages and literature; (2) history; (3) philosophy; (4) appreciation courses in music and art; (5) linguistics; and occasionally from other fields deemed suitable.

Russian

Associate Professor Jezierski; Assistant Professors M. Pavlov, H. Pavlov, Mr. Duda; Swan and Mr. Apte

1-2. *Elementary Russian.* Introduction to understanding, speaking, reading and writing. Audio-lingual techniques are combined with required recording-listening practice in the language laboratory. 8 s.h. (w) *Staff*

63-64. Intermediate Russian. Intensive classroom and laboratory practice in spoken and written patterns. Reading in contemporary literature. Prerequisite: Russian 1-2, or two years of high school Russian. 8 s.h. Staff

91-92. Advanced Russian. Systematic study of syntax and style in the written and spoken language. Readings of nineteenth and twentieth century authors. Oral and written reports. Conducted in Russian. Prerequisite: Russian 63-64, or equivalent. 6 s.h. (w) Pavlov

97, 98. Spoken Russian. Intensive instruction in the spoken language; contemporary Russian prose provides the basis for vocabulary building, and for practice in structural patterns. Does not satisfy the minimum uniform requirement. Limited to 15 students. Prerequisite: Russian 92. 3 s.h. M. Pavlov

101, 102. Russian Literature and Culture Through the Nineteenth Century. Russian prose, poetry and criticism, with special attention to recent periods. Readings (from *The Igor Tale* to Blok) in English. Lectures and class discussion. 6 s.h. (w) Jezierski

103. Soviet Literature and Culture. Literature since 1917, as a continuation of nineteenth-century traditions and as a response to Soviet ideology. Readings (in English or Russian) from major works of prose, poetry and drama. 3 s.h. (w) Jezierski

105. The Russian Theatre and Drama. Russian drama from its beginnings to the present. Lectures, class, discussions, readings of plays in English or Russian. 3 s.h. (w) Jezierski

112. Pushkin and the Birth of Russian Realism. An intensive study of the works of Russia's greatest poet. Readings in English or Russian. Prerequisite: Russian 101 or instructor's consent. 3 s.h. (w)

191, 192. Independent Study. Directed reading and research. Open only to highly qualified students by permission of the department. (See page 38.) 6 s.h.

201, 202. The Novelists of Nineteenth Century Russia. Development of the Russian novel against the European background, with emphasis on Dostoevskij and Tolstoj. Extensive readings in English or Russian. Lectures, oral reports, class discussions and term paper. 6 s.h. (w) Jezierski

Departmental Major

Prerequisite. Russian 1-2

Major Requirements. Russian 63-64 and 18 semester hours in the department including 91-92 and at least 6 semester hours of senior-graduate courses.

Related Work. 18 semester hours chosen with the approval of the department from the humanities, history and the social sciences.

Sociology and Anthropology

Professor McKinney, *Chairman*; Assistant Professor Farley, *Director of Undergraduate Studies*; Professors Back, Kerckhoff, La Barre, Maddox, and Thompson; Associate Professors Beidelman, McCormack, Marsh, Preiss, Rowe, Roy, Smith, Tiryakian, and Winsborough; Assistant Professor Bowers; Lecturer Apte

Sociology

Sociology 91 or 92, or the equivalent or special permission of the instructor or the Director of Undergraduate Studies, is a prerequisite for all sociology courses at the 100 and 200 levels.

91. *Introduction to Sociology: Concepts and Procedures.* Concepts and procedures of sociology and illustrations of their use in understanding specific areas of social life. 3 s.h. (E & W) Open to Freshmen. *Staff*

92. *Introduction to Sociology: Sociological Studies.* Application of theories and methods of sociology through an examination of several empirical studies dealing with various aspects of social behavior. 3 s.h. Open to Freshmen. (E & W) *Staff*

136. *Sociology of Modern Africa.* An introduction to the modernization of sub-Sahara Africa. Primary emphasis given to the nature and formation of colonial society, as well as to process of decolonization and its sources. 3 s.h. (W) *Tiryakian*

139. *Comparative Social Structure.* Comparison of social phenomena in two or more societies. Sociological propositions, tested with American data and data from other societies. 3 s.h. (W) *Marsh*

141. *Introduction to Population and Human Ecology.* This course provides an introduction to two macroscopic aspects of society. Both the size, distribution and composition of populations, and the morphological aspects of collective life are considered. 3 s.h. (W) *Winsborough and Farley*

142. *The Sociology of Mass Communication.* An analysis of the role of radio, the press, magazines, movies and television in modern societies. An examination of the selective audiences, content characteristics, controlling elements, and organizational structure of the various media of mass communication. 3 s.h. (W) *Smith*

143. *Deviant Social Behavior.* Analysis of deviant behavioral systems (illness, crime, delinquency, etc.) in terms of (a) precipitating social factors, (b) patterns and goals, (c) remedial and counter-acting controls. 3 s.h. (W) *Preiss*

145. *Urban Sociology.* Historical, demographic, and ecological materials are used to study urban society with respect to its institutions, inter-

action patterns, differentiation, integration, disorganization, and decentralization. 3 s.h. (w) *Smith and Farley*

146. *Industry and Society.* A study of industrial institutions in their interrelationships with other forms of social behavior in the broad cultural setting of western civilization. Attention will center upon analysis of specific social problems resulting from the impact of industrial change. 3 s.h. (w) *Roy*

150. *The Family.* Analysis of the American family as an institutionalized group and its relationship with other institutions and structural features such as social class and ethnic group. Special attention is devoted to methods of research in this area. 3 s.h. (w) *Kerckhoff and Roy*

151. *Sociology of Religion.* The religious factor in society and the social factor in religion. Major sociological theories and selected research studies. 3 s.h. (w) *Tiryakian*

153. *Sociology of the South.* The developing regional organization of the world economy studied with especial reference to Southern life. A survey of the composition and distribution of population, races and race relations. Primary emphasis is upon social change. 3 s.h. (w) *Thompson*

154. *The Sociology of the Arts.* An analysis of the social relations of the world of the arts (painting and sculpture, music, and literature) with emphasis upon creative artists, art publics, art organizations and art works as they function in their social-cultural milieu. 3 s.h. (w) *Back*

155. *Introduction to Industrial Sociology.* An analysis and appraisal of the various factors that affect human relations in industry. The interpersonal and intergroup relationships within the individual industrial unit which determine its efficiency as an economic and social institution and the social conditions in the community as they affect social relations. 3 s.h. (w) *Roy*

159. *The Negro in America.* A study of the history and changing status of the Negro regarded as a symbol and protagonist of minority groups in America and elsewhere. 3 s.h. (w) *Thompson*

172. *Collective Behavior and Social Movements.* Examination of disruptive and relatively unorganized aspects of social phenomena such as crowd behavior, fads, rumors, crazes and social movements as indexes of social disequilibrium and potential sources of social change. 3 s.h. (w) *Kerckhoff*

193. *Independent Study.* Directed reading and research. Required of candidates for graduation with distinction in the department. Open only to highly qualified students in the senior year, by permission of the department. 3 s.h. (w) *Staff*

199. *The Changing South.* (See Interdisciplinary Course 199.)

241. *Social Stratification.* The nature of hierarchical and vertical differentiation in the economic, political and prestige structures in modern

societies. The interrelationship of class, status and power strata and their influence on social institutions, personality structure, and group and individual behavior. 3 s.h. (w) *Marsh and Roy*

242. *The Sociology of Occupations and Professions.* The social significance of work. Analysis of forces changing the contemporary occupational structure, typical career patterns of professions and occupations, the social organization of occupational groups. 3 s.h. (w) *McKinney and Roy*

243. *Population Dynamics and Social Change.* Introduction to demographic analysis. The relationship between the demographic structure of society and its social organization. 3 s.h. (w) *Winsborough*

247. *Community and Society.* This course seeks to provide a frame of reference for the analysis and ordering of facts pertaining to the diverse cultures of the world, the State, the world community, the Great Society, and news, mass behavior, social problems, races and classes. 3 s.h. (w) *Thompson*

251. *The Sociology of Modernization.* Changes, obstacles to change, and structural strains which occur in kinship, stratification, bureaucracy and the role of the military, occupations and work, communications, values and ideologies, during modernization. Special reference to Asian societies. 3 s.h. (w) *Marsh*

253. *Social Institutions.* The study of particular institutions and the social movements out of which they developed, with emphasis on the development of general propositions concerning the nature, function and importance of institutions in society. 3 s.h. (w) *Thompson*

255. *Race and Culture.* A comparative study of race relations in world perspective developed around such themes as race and personal identity, the geography and ecology of race relations, the idea of race, and race conflict. 3 s.h. (w) *Thompson*

259. *Religion and Social Change.* The role of religion in significant social changes in Western and non-Western societies: non-institutional phenomena (charisma, prophecy, messianism, revivals, glossolalia). Prerequisite: either Anthropology 264, Sociology 151, or the equivalent. 3 s.h. (w) *Tiryakian*

272. *The Socialization Process.* Universal societal requirement for continual replacement of socialized personnel. Variations in socialization by position in the social structure (class, caste, urban-rural, etc.) and contributions made by various socialization agencies (family, school, peer groups, mass media). Western society is the focus of study. 3 s.h. (w) *Kerckhoff*

275. *Social Attitudes and Individual Behavior.* Such issues as the following are considered: the importance of symbolic interaction, the development of the "self," the social structuring of the socialization process, individual movement within the social structure, and the im-

portance of membership groups and reference groups. 3 s.h. (w) *Back and Kerckhoff*

278. *Social Structure and the Life Cycle.* A study of the relationship between age as a social characteristic and social interaction, with particular reference to adolescence and old age. 3 s.h. (w) *Maddox*

282. *Principles of Sociological Analysis.* A systematic theoretical examination of the social order, focusing on its structural components and the functions they serve. 3 s.h. (w) *Thompson*

295. *Methodology in Sociology.* Considerations of the nature of scientific method, as well as alternative paths to knowledge, as they apply to sociology. Conceptualization, hypothesis formation, and definition. The research process as a decision-making situation both on the general level of research design and the specific level of special techniques. The process and logic of data analysis. Relations of theory and research are stressed. 3 s.h. (w) *Smith and Back*

297. *Statistical Analysis in Sociology.* Such techniques as zero and higher order linear and curvilinear correlation, partial correlation, analysis of variance and covariance and factorial design are studied. When possible, analogous nonparametric techniques are also considered. Prerequisite: Mathematics 233 or an equivalent course or permission of the instructor. 3 s.h. (w) *Winsborough and Farley*

Departmental Major in Sociology

Major Requirements. Twenty-four semester hours of work in Sociology including either or both Sociology 91 and 92 and at least six semester hours in the Senior-Graduate courses.

Related Work. A minimum of eighteen semester hours, at least twelve of which are normally chosen from two of the following fields: economics, education, history, mathematics, political science, and psychology. Additional courses in other fields may also be elected as related work when indicated by the educational requirements of the student and approved by the Departmental adviser.

Anthropology

93. *General Anthropology.* Origins and distribution of mankind; a survey of human paleontology and human biology, world archaeology, prehistory and languages; and the origins of the family, primitive economics, arts, social and political organization. Special attention is given to primitive people. 3 s.h. (w) *Staff*

94. *Cultural Anthropology.* A study of the dynamics of culture, the causal factors, functions, integration and disintegration, diffusion, growth and change of cultures. Emphasis is upon the simpler societies. 3 s.h. (w) *Staff*

101, 102. *Introduction to the Civilizations of Southern Asia.* (See Interdisciplinary Course 101, 102.)

121, 122. *World Ethnography.* The major cultural areas of the world in terms of the "universal culture pattern." Ethnographic records are used to illustrate and appraise non-Western man's environment. 3 s.h. (w) Staff

124. *Peoples of the World: American Indian.* A comprehensive survey of the Indians of North and South America, including a study of origins and prehistory, archaeology, racial affiliations, languages, material culture, social and political organization, economics and religion, discussed in terms of the "culture area" concept. 3 s.h. (w) La Barre

126. *Peoples of the World: Oceania.* Selected problems in the development of pre-European and post-European cultures. The relationships between man and Pacific environments. 3 s.h. (w) Bowers

128. *Peoples of the World: Asia.* A comprehensive survey focusing on the peoples and societies of South, Southeast and East Asia, including the prehistoric, ethnic, linguistic, religious and political foundations of the complex civilizations; the response of traditional Indian, Chinese and Japanese cultures to the West. 3 s.h. (w) McCormack and Rowe

130. *Cultural Change and Stability.* Contemporary theories of culture change, especially those resulting from acculturation and from implementation of programs of technical and economic aid; a consideration of the factors significant in maintaining stability or stimulating change in traditional cultures. 3 s.h. (w) Bowers and Rowe

134. *Political Anthropology.* Comparative study of conflict and political action. Decision making as related to social structure and cultural values. Stateless, emergent, and underdeveloped societies. 3 s.h. (w) Rowe

137. *Comparative Social Organization.* Social anthropological analysis of role structures and corporate groups in particular societies, and their relevance for understanding the historic process of civilization. Case study of social types and of the unique features of societies revealed by the comparative method. 3 s.h. (w) McCormack

193. *Independent Study.* Directed reading and research. Open only to highly qualified students in the senior year, by permission of the Director of Undergraduate Studies. 3 s.h. (w) Staff

199. *The Changing South.* (See Interdisciplinary Course 199.)

220. *Society and Culture in India.* The basic features of Indian cultures and societies from an anthropological perspective. The impact of selected technological and social changes upon the individual, caste, and community. 3 s.h. (w) Rowe and McCormack

222. *Topics in African Anthropology.* Current research problems in African anthropology, illustrated by a study of tribal societies, in terms of

contemporary theories about culture and society. 3 s.h. (w) *Beidelman*

231. *Physical Anthropology.* Human evolution, primate phylogeny, paleontology of man and other primates, primate biochemical genetics, primate behavior, human variation (genetic and somatic). (Also listed as Anatomy M 231.) 3 s.h. (w) *Buettner-Janusch*

238. *Language and Society.* An introduction to the study of language and society. Universal features of language, language as a mirror of society and social perception through language, language as a coding system, linguistics and anthropology, applied linguistics. 3 s.h. (w) *Apte and McCormack*

260. *Linguistic Anthropology: Phonemics.* Application of descriptive linguistics to analysis of language; concentration on the sound system of a South Asian language, and other non-Western languages. 3 s.h. (w) *Apte*

261. *Linguistic Anthropology: Morphology and Syntax.* Application of descriptive linguistics to analysis of language; concentration on the grammatical system of a South Asian language, and other non-Western languages. Prerequisite: Anthropology 260. 3 s.h. (w) *Apte*

262. *Anthropology of Law.* Legal decision in preliterate societies. The interrelationships of law, ritual, and myth. 3 s.h. (w) *Beidelman*

263. *Primitive Art and Music.* A comparative ethnological study of non-European art and music; sufficient technical background will be provided for non-specialist students. 3 s.h. (w) *La Barre*

264. *Primitive Religion.* The ethnography, the social functions, and the socio-psychological meanings of religion in primitive societies. 3 s.h. (w) *LaBarre*

265. *Personality and Society.* The sociology and social psychology of human personality, its origins in the primary group, its nature and varieties and its integrations into secondary group institutions. 3 s.h. (w) *La Barre*

266. *Personality and Culture.* The influence of culture patterns and social institutions upon character structure, socialization of the individual, and the dynamics of human personality. Comprehensive anthropological materials will be drawn upon. 3 s.h. (w) *La Barre*

292. *Anthropological Theory.* Theoretical, methodological and comparative issues in anthropology. 3 s.h. (w) *Beidelman and Rowe*

Departmental Major in Anthropology

Major Requirements. Twenty-four semester hours of work in Anthropology including both Anthropology 93 and 94 and at least six semester hours in the Senior-Graduate courses.

Related Work. A minimum of eighteen semester hours, at least twelve

of which are normally chosen from two of the following fields: anatomy, art, botany, economics, history, mathematics, political science, psychology, and zoology. Additional courses in other fields may be elected as related work when indicated by the educational requirements of the student and approved by the Departmental adviser.

Spanish

For courses in Spanish, see *Romance Languages*, p. 168.

University Courses

Fall Semester

199.1 *The Impact on our Society and Culture of Modern Scientific and Technological Development.* Paul M. Gross

199.2 *The Arts at Mid-Century.* Iain Hamilton

199.8 *The Criticism of Lyric Poetry.* Bruce Wardropper

Spring Semester

199.9 *Studies in Christian History as a Liberalizing Force in the University.* Ray C. Petry

Zoology

Professor Horn, *Chairman*; Professor Bailey, *Director of Undergraduate Studies*; Professors Bookhout, Fluke, Gray, Gregg, Menzies, Schmidt-Nielsen, and Wilbur; Adjunct Professor Stefánsson; Associate Professors Buettner-Janusch, Costlow, Hunter, Klopfer, Livingstone, Nicklas, Vernberg, Wainwright, and Ward; Assistant Professors Herreid and Tucker; Instructors Bartell, Richardson and Sheppard

1-2. *Biology.* (See course listing under Biology 1-2.)

53. *Comparative Vertebrate Anatomy.* A study of the anatomy and evolution of the organ systems of vertebrates. Prerequisites: Biology 1-2. 4 s.h. (w) Horn

71. *Heredity and Eugenics.* Effects of environment and heredity upon the individual and populations; interpretation of human genetic histories. Prerequisite: one year of zoology. 3 s.h. (w) Ward

92. *General Embryology.* An introduction to the study of developmental processes. Prerequisite: Biology 1-2. Recommended Zoology 53. 4 s.h. (w) Gregg

103. *Principles of Ecology.* An introduction to the study of organisms in natural habitats, with particular attention to the growth of animal populations, the chemical role of organisms, energy flow through food chains, and the development of ecological systems through geologic time. Prerequisites: Biology 1-2, Mathematics 17 or 21. 4 s.h. (w) *Livingstone*

109. *Evolution.* Analysis of the processes of adaptation and evolution in individuals, populations, and genetic systems. Lectures and student reports. Prerequisite: Genetics or consent of the instructor. 3 s.h. (w)

110. *Introduction to Genetics.* The principles and practical application of genetics. Prerequisite: one year of zoology or consent of instructor. 3 s.h. With laboratory—4 s.h. (w) *Ward*

120. *Ornithology.* Lectures, laboratory and field trips dealing with the classification, adaptations, and natural history of birds. Prerequisite: one year of zoology. Zoology 53 recommended. 4 s.h. (w) *Bailey*

131. *Human Evolution.* Evolution of the order Primates and the origins of man. Primate paleontology, biochemical genetics, primate behavior, human variation. Prerequisites: A year of biology and a course in genetics. (Combined course with Anthropology 131). 3 s.h. (w) *Buettner-Janusch*

146. *Physical Biology.* Physical principles of structure and function in large biological molecules and aggregates, applications to heredity, to function at higher levels of organization, and to biological fitness and accommodation. Prerequisites: Mathematics 22, Chemistry 151, a year of college physics (or equivalents), one and one-half years of college biology, or consent of the instructors. 4 s.h. (w) *Fluke and Wainwright*

148. *Elementary Biochemistry.* The chemistry of proteins, lipids, carbohydrates and nucleic acids and the metabolic interrelationships of these compounds. Subjects of special interest to biologists, including photosynthesis, chemical genetics, vision, nutrition and the chemical basis of muscle and nerve function. Prerequisites: Chemistry 151, one year of college physics (second semester may be concurrent), Mathematics 22, or consent of the instructor. 3 s.h. (w) *R. Hill and Fridovich (Biochem.)*

151. *Principles of Physiology.* An introductory survey of physiological functions. Prerequisites: At least a year of zoology and a year of chemistry. 4 s.h. (w) *Tucker*

156. *Vertebrate Histology.* The microscopic structure of normal tissues and organs of the vertebrate body. Training will be given in the preparation of material for microscopic study. Prerequisite: Open only to juniors and seniors who have completed two years of zoology. 4 s.h. (w)

161. *Animal Parasites.* An introductory course dealing with biological principles involved in parasitism of animals including man. Prerequisite: one year of zoology. 4 s.h. (w) *Mrs. Hunter*

196. *Seminar*. Open to junior and senior departmental majors. 2 s.h.
(w) *Staff*

197, 198. *Special Problems*. Senior and Junior majors who have had proper training may be permitted to carry on special work. Permission must be obtained from the Director of Undergraduate Studies and the instructor under whom the student wishes to work. Not more than 4 s.h. may be counted toward major work. (w) *Staff*

For Seniors and Graduates

201. *Animal Behavior*. A review of the major developments in the field with emphasis on recent physiological and developmental studies. Prerequisites: physiology, genetics and evolution, or consent of instructor. 3 s.h.; 4 s.h. with laboratory. (w) *Klopper*

203. *Ecology*. Relation of animals to environment. Lectures, readings, reports, conferences; laboratory and field work. 4 s.h. (w) *Gray*

210. *Experimental Genetics*. The relationship of phenotype to genome and environment; cytogenetics, recent research in the field of genetics. Prerequisites: Principles of heredity (one of the following: Zoology 110, Botany 101, 202, or equivalent), or consent of instructor. 4 s.h. (w) *Ward*

214. *Biological Oceanography*. Composition in time and space of marine biosphere in relation to descriptive marine chemistry, physics, and geology. Some work at sea aboard the research vessel. Prerequisites: A course in invertebrate zoology, ecology, marine biology or an appropriate equivalent; chemistry through organic; one year of physics and mathematics. 4 s.h. (Given at Beaufort only.) *Menzies*

215. *General Physical and Chemical Oceanography*. Relief of the ocean floor; physical and chemical properties of sea water; distribution of temperature, salinity and density; heat budget; sea ice; light; ocean currents, waves and tides; selected topics of regional oceanography. Prerequisites: One year each of physics and chemistry, Mathematics 22 or equivalent. 6 s.h. (Given at Beaufort only.) *Stefánsson*

216. *Limnology*. A study of lakes, ponds and streams, including their origin, development, geochemistry, energy balance, productivity, and the dynamics of plant and animal communities living in them. Lectures, field trips, and laboratory work. Usually offered in alternate years. Prerequisites: one year each of biology, chemistry and physics, and Mathematics 21; or permission of instructor. 4 s.h. (w) *Livingstone*

222. *Entomology*. Anatomy, physiology, embryology, and classification of insects. Prerequisite: One year of zoology. 4 s.h. (w) *Gray*

224. *Vertebrate Zoology*. A study of life histories, adaptations, ecology, and classification of vertebrate animals. Prerequisite: Zoology 53. 4 s.h.
(w) *Bailey*

- 228. *Experimental Embryology.*** Lectures, readings, reports, and laboratory work. 4 s.h. *Gregg*
- 238. *Systematic Zoology.*** The fundamental theory and practice involved in the collection, identification, and classification of animals. Prerequisites: Biology 1-2. 4 s.h. (w) *Bailey*
- 243. *Cytology.*** The structure of the cell. Lectures, readings, reports, and laboratory work. Prerequisites: Zoology 53, 92, 156 or equivalent and consent of instructor. (Combined course with Botany 203.) 4 s.h. (w)
- 244. *Topics in Cell Structure and Function.*** Advanced discussions of selected problems such as chromosome structure, mitosis, and cytological aspects of inheritance and development. Prerequisite: Zoology 243 (Botany 203) or equivalent and permission of the instructor. 2 s.h. (w) *Nicklas and Moses (Anatomy)*
- 245. *Radiation Biology.*** Actions of ionizing and excitational radiations on life processes: a survey and an adventure in biophysics. Prerequisites: College physics, mathematics and organic chemistry. 3 s.h., or 4 s.h. with laboratory (w) *Fluke*
- 246. *Molecular Biology.*** The nature, functional relationships, and replication of biological structure at the molecular level. Laboratory projects optional by arrangement. Prerequisites: College physics, mathematics, and organic chemistry. Biochemical and genetic background are suggested. 3 s.h., or 4 s.h. with instructor's advance approval of laboratory work. (w) *Fluke*
- 247. *Biological Nucleonics.*** Lecture and laboratory instruction in biological uses of radioactive tracers, in counting instruments and measurements, and in legal requirements. Prerequisites: Consent of instructor and one year each of college biology, chemistry and physics. 3 s.h. *Fluke and Woods (Forestry)*
- 250. *Physiological Ecology of Marine Animals.*** A study of the physiological responses of marine animals in relation to certain environmental factors and evolution. Animals representing numerous phyla and from various habitats are studied. Prerequisite: Zoology 151 or equivalent. 6 s.h. (Given at Beaufort only.) *Vernberg*
- 252. *Comparative Physiology.*** The physiological mechanisms of animals studied on a comparative basis. Prerequisite: Zoology 151 or equivalent. 4 s.h. (w) *K. Schmidt-Nielsen*
- 271. *Cellular Physiology.*** The physiological processes of living matter approached through studies of cells. Prerequisites: Two years of biology and at least one year of chemistry. 4 s.h. (w) *Wilbur*
- 274. *Invertebrate Zoology.*** A study of structure, functions, and habits of invertebrate animals under normal and experimental conditions. Field trips will be made to study, collect, and classify animals in their natural habitats. Prerequisites: Biology 1-2. 4 s.h. (w) *Bookhout*

276. Protozoology. The morphology, physiology, taxonomy, and culture of protozoa. Prerequisites: Biology 1-2. 4 s.h. (w) *Bookhout*

278. Invertebrate Embryology. Lectures, readings and laboratory work dealing with rearing, development, and life history of invertebrates. Prerequisite: Zoology 92. 4 s.h. (w) *Bookhout*

Marine Laboratory. The following courses are given at Duke University Marine Laboratory, Beaufort, N. C.: 203, Marine Ecology; 214, Biological Oceanography; 215, General Physical and Chemical Oceanography; 250, Physiological Ecology of Marine Animals; 274, Marine Invertebrate Zoology. Consult the announcement of the Duke University Marine Laboratory.



Departmental Major

Prerequisites. Biology 1-2.

Major Requirements (for both A.B. and B.S. degrees). A minimum of 24 s.h. of zoology including at least one course in each of the following three areas: morphology (53, 92, 156, or 278), physiology (151 or 271), and genetics (71 or 110).

With the prior approval of the Director of Undergraduate Studies, up to 6 s.h. of advanced work in the natural and formal sciences, other than zoology, may be counted toward the 24 s.h. of the zoology major.

Related Work.

For the A.B. Degree:

Related work will include at least one year of chemistry with additional work usually chosen from courses in botany, chemistry, geology, mathematics, or physics. The language requirement will preferably be met by French, German, or Russian.

For the B.S. Degree:

Related work will include Chemistry 151 and 152 with additional work chosen from courses in botany, geology, mathematics or physics. Language requirements may be met by two languages, chosen from German, French, or Russian.

For interdisciplinary programs involving biology see page 11 of this *Bulletin*.

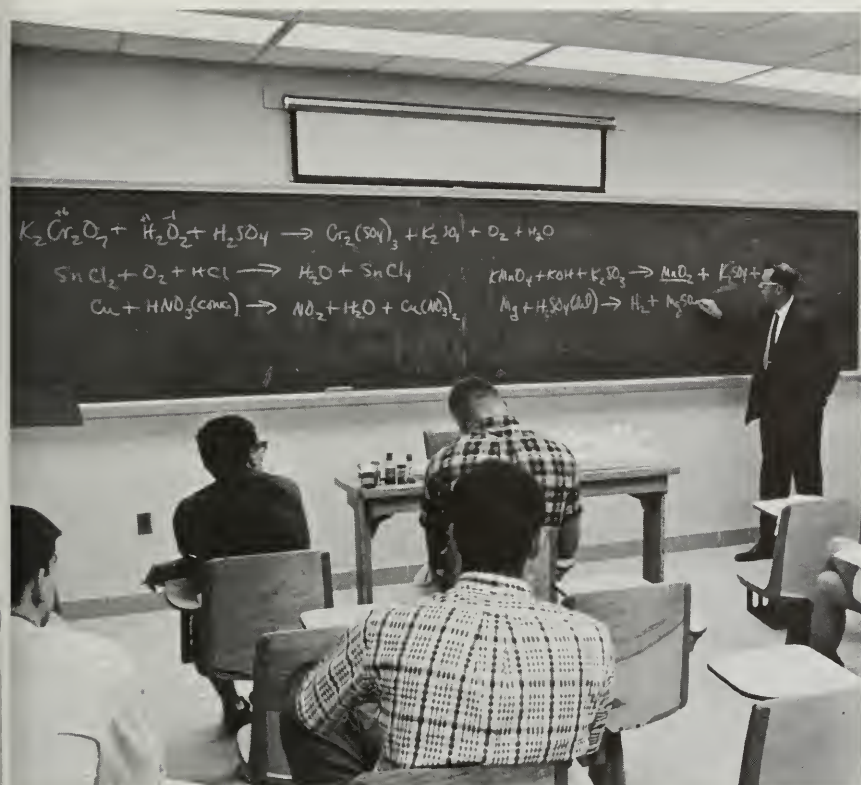
The Department offers work leading to graduation with distinction. See the section on Honors.

College of Engineering

Engineering Common-Core Undergraduate Courses

Engrg 1. Engineering Design I. Introduction to the "engineering process" through solving problems of engineering design. Problems are posed so that the student will gain some experience in utilizing his knowledge to devise logical solutions. Elements of engineering graphics are included as a means of visualizing and communicating engineering problem solutions. 2 s.h. (w) *Bock, Hill, Lewis, and Sheppard*

Engrg 2. Engineering Design II. Continuation of engineering design, the problems being larger in scope than those of the first semester, involving larger design teams, the supposition of more realistic budgets, and closer attention to ultimate feasibility. Principles of orthographic projection applied to graphics problems involving intersections and development of surfaces and the relationship of lines and planes; charts, graphs,



graphical calculus. Introduction to use of digital computer in engineering design. 2 s.h. (w) *Bock, Hill, Lewis, Sheppard, and Wells*

Engrg 23. Statics. Analysis of force systems and their equilibrium as applied to engineering systems; algebraic methods used with vector notation where appropriate. Principle of virtual work, stability of equilibrium; friction; distributed force systems; equilibrium of differential elements. Corequisite: Math 22. 3 s.h. (w) *Arges, Bock, and Holland*

Engrg 53. Engineering Design III. An introduction to the theory and techniques of measurement with emphasis on the design of measurement systems: the nature of experimental error, interpretation of experimental data, and error analysis. Laboratory with design and execution of selected measurement problems. Prerequisite: Math 22. 2 s.h. (w)

Engrg 57. Statics. A study of force systems equilibrium by algebraic and graphic methods, friction, centroids, moments of inertia. Prerequisite: Engrg 1; concurrent: Phys 41 and Math 63. 3 s.h. (w)

Engrg 60. Engineering Mechanics. A study of statics and dynamics, as applied to particles and rigid bodies. Fundamentals are developed using

vector and scalar values. Concurrent: Phys 41 and Math 63. 4 s.h. (w) *Barton, Holland, Nash, and Wood*

Engrg 63. *Introductory Electric Systems I.* Complete analysis (transient and steady state) by transform methods of linear lumped parameter networks. Primary emphasis on electric networks but mechanical and electro-mechanical networks included. Application of modern analysis techniques to present day electrical engineering systems that are of concern to all engineers, e.g., amplifiers and transducers. Laboratory included. Corequisites: Math 63 and Phys 41. 3 s.h. (w)

Engrg 73. *Mechanics of Deformable Bodies.* Stresses and strains in deformable bodies; mechanical behavior of materials and relation of stress to strain; applications of principles to static problems of beams, torsion members, columns, elementary shells; introduction to energy principles, applications. Selected laboratory work. Prerequisite: Engrg 23. 3 s.h. (w)

Engrg 83. *The Structure and Properties of Solids.* An introduction to materials science and engineering, emphasizing the relationships between the structure of a solid and its properties. The atomic and molecular origins of electrical, mechanical and chemical properties are treated in detail for metals, alloys, polymers, ceramics, glasses and composite materials. Prerequisite: Chem 2. Corequisite: Math 63. Engineering 73 should be taken concurrently. 3 s.h. (w) *Pearsall*

Engrg 101. *Thermodynamics.* A basic study of the laws of thermodynamics and their use in engineering analysis and design. The study of the thermodynamic properties of substances is included. Prerequisite: Chem 2, Phys 42. 3 s.h. (w)

Engrg 107. *Mechanics of Materials.* Stresses and strains in elastic bodies; shear and moment diagrams; stresses in beams; beam deflections by double integration and area-moments; statically indeterminate beams, torsion, principal stresses. Prerequisite: Engrg 57 or Engrg 60; concurrent: Math 64. 3 s.h. (w) *Arges and Palmer*

Engrg 109. *Mechanics of Materials Laboratory.* Study and use of testing machines and strain gages; tests to determine significant mechanical properties of common engineering materials; experimental verification of the elementary theory of structural members. Concurrent: Engrg 107. 1 s.h. (w) *Barton and Sheppard*

Engrg 113. *Introductory Electric Systems II.* A continuation of Engrg 63. Selected laboratory work. 3 s.h. (w)

Engrg 115. *Dynamics.* General principles of dynamics as applied to particles and rigid bodies. Translation, rotation, general plane motion, work and energy, impulse and momentum, gyroscopic motion. Prerequisite: Engrg 57; concurrent: Math 64. 3 s.h. (w) *Arges*

Engrg 123. *Dynamics.* General principles of dynamics of engineering systems. Kinematics of motion; dynamics of particles, systems of particles,

rigid bodies. Impulse-momentum and work-energy principles. Introduction to advanced methods in dynamics; Lagrange's equation. Prerequisite: Engrg 23, Phys 41. Corequisite: Math 64. 3 s.h. (w)

Engrg 128. *Fluid Mechanics.* Physical properties of fluids, fluid statics, continuity and energy principles, pressure-momentum principle, elementary principles of turbines and pumps, flow of a real fluid, dimensional analysis and dynamic similarity, fluid flow in closed conduits and in open channels; fluid measurements. Prerequisite: Engrg 60, or concurrent: Engrg 115. Prerequisite: Math 64. 3 s.h. (w) *Harrawood*

Engrg 133. *Heat Transfer.* An introduction to the concepts of conduction, convection and radiation. A study of temperature gradients, steady and transient heat flow by analytical, graphical, numerical and analogical methods. Selected laboratory work. Corequisite: Engrg 101, Math 64. 2 s.h. (w)

Engrg 143. *Fluid Mechanics.* Physical properties of fluids; fluid flow concepts and basic equations; continuity, energy and momentum principles; dimensional analysis and dynamic similitude; viscous effects; applications, emphasizing one-dimensional flow theory for incompressible, real fluids. Selected laboratory work. Corequisite: Engrg 123, Math 64. 2 s.h. (w)

Engrg 163. *Fields.* Treatment of selected topics in field theory of interest to engineers. Basic field concepts, the Laplacian, field sources, waves, diffusion, continuum concepts, the wave nature of elementary particles. The common structure of field theory is applied to selected topics such as thermal conduction, fluid fields, stress-strain in elastic solids, electric and magnetic fields, and electromagnetic fields. Selected laboratory work. Corequisite: Math 111; Engrg 113, 123, 133, and 143. 3 s.h. (w)

Engrg 169.* *Legal Aspects of Engineering.* A course designed to introduce engineering students to those aspects of the law encountered in the practice of engineering. Subjects included are: contracts and specifications, real and personal property, torts, insurance, agency, equity, evidence, labor management, sales, expert testimony, engineering registration and ethics. Open to seniors only. 3 s.h. (w) *Ross*

Engrg 170.* *Patent Law for Engineers.* A course designed to familiarize engineering students with the legal principles and procedures for protecting patentable inventions, such as drafting and analysis of specifications and claims, study of infringements, assignments, licenses, and record documentation. Open to seniors only. 3 s.h. (w) *Olive*

Civil Engineering

Professor Brown, *Chairman*; Professor Bryan, *Director of Undergraduate Studies*; Professor Vesic; Associate Professors Hill, and Palmer; Assistant

Professors Arges, Barton, Harrawood, Holland, and Wood; Visiting Professor Abeles; Visiting Associate Professor Kumar; Instructor Sheppard

CE 61. *Plane Surveying.* Use and adjustment of instruments; transit-tape, stadia, and plane table surveying; differential and profile leveling; calculation of bearings, latitudes, departures, and areas; accuracy and errors; topographic mapping; rural and urban land surveys; celestial observations for azimuth; triangulation; introduction to photogrammetry. Prerequisites: Engrg 1 and Math 21. 5 s.h. (w) *Sheppard*

CE 72. *Materials Laboratory.* Blending of granular materials and determination of their physical properties, design of concrete and bituminous mixtures, consistency limits of soils. 1 s.h. (w) *Holland*

CE 101. *Soil Mechanics Laboratory.* Soil exploration and sampling. Laboratory determination of index properties: water content, void ratio, particle size, Atterberg limits. Consolidation testing. Triaxial shear testing. Classification and identification of soils. Compaction testing. Demonstrations of seepage, bearing capacity and earth pressure phenomena. Concurrent: CE 135. 1 s.h. (w) *Holland and Vesic*

CE 110.* *Plane Surveying.* Use and adjustment of instruments; transit-tape, and stadia surveying; differential and profile leveling; calculation of bearings, latitudes, departures, and areas; accuracy and errors; topographic mapping. Prerequisites: Engrg 1 and Math 21. 3 s.h. (w) *Arges*

CE 113. *Route Surveying.* Simple, compound and reverse curves; spirals; earthwork and grading plans. Prerequisite: CE 61. 2 s.h. (w) *Sheppard*

CE 116. *Transportation Engineering.* Location, design, construction and maintenance of highways and city streets; soil stabilization; traffic studies; economics of planning and design. Prerequisite: CE 113 and 135. 3 s.h. (w) *Holland*

CE 118. *Materials of Engineering.* Behavior of materials under load; mechanical properties as criteria for failure; elementary metalurgy. Ferrous and non-ferrous metals and non-metallic materials. Prerequisites: Engrg 109 and Chem. 2. 2 s.h. (w) *Pearsall*

CE 121.* *Hydrology.* Fundamentals of meteorology; precipitation; evaporation. Ground water development. Stream flow and stream gaging. Hydrograph analysis. Flood routing. Field trips to be arranged. Prerequisite: Engrg 128. 3 s.h. (w) *Bryan*

CE 123. *Hydraulic Engineering.* Pipe flow, compound pipe systems, network analysis, analysis and problems on pumps and turbines, fundamental aspects of hydrology. Open channel flow, non-uniform flow computations. Irrigation and drainage problems. Flood control and hydraulic structures. Prerequisite: Engrg 128. 3 s.h. (w) *Wood*

CE 124. *Fundamentals of Sanitary Engineering.* Engineering and

* Offered only upon sufficient demand; enrollment limited.

public health aspects of water treatment and supply, waste treatment and disposal, and environmental sanitation. Design basis for collection and treatment facilities. Laboratory procedures and interpretation of results. Prerequisites: Chem. 2 and CE 123. 3 s.h. (w) *Bryan*

CE 126.* Sanitary Engineering Design. Design of facilities for providing an adequate supply of water and means for treatment and disposal of wastes. Stream sanitation as it affects location and design of treatment works. Prerequisite: CE 124. 3 s.h. (w) *Bryan*

CE 131. Structural Mechanics I. Shears, moments, and internal forces by algebraic and graphic methods under various conditions of loading. Deflection of trusses. Prerequisite: Engrg 107. 3 s.h. (w) *Brown*

CE 132. Structural Design. Tension, compression, flexural members, eccentric connections, unsymmetrical bending, riveted and welded plate girders, trusses and office building frames. Timber design using ring connectors. Design and detail drawings. Prerequisite: CE 131. 4 s.h. (w) *Palmer*

CE 133. Reinforced Concrete. Theory and design of reinforced concrete beams, columns and footings. Moment distribution. Prerequisite: CE 131. 3 s.h. (w) *Palmer*

CE 135. Introduction to Soil Mechanics. Origin and composition of soils, soil structure. Flow of water through soils, capillary and osmotic phenomena. Soil behavior under stress; compressibility, shear strength. Elements of mechanics of soil masses with application to problems of bearing capacity of foundations, earth pressure on retaining walls, and stability of slopes. Prerequisites: Engrg 107, 109, and 128; concurrent: CE 101. 2 s.h. (w) *Vesic*

CE 140. Structural Mechanics II. Analysis of statically indeterminate structures by various methods including those of elastic energy. Prerequisite: CE 131. 3 s.h. (w) *Barton*

CE 143, 144.* Projects in Civil Engineering. This course may be assigned by the Chairman of the Department to certain seniors who have shown an aptitude for research, in which case it may be substituted for certain civil engineering courses. 3-6 s.h. (w) *Staff*

CE 146. Professional Engineering. Topics related to the practice of civil engineering: engineering economy, contracts, specifications, and ethics. Presentation of student papers on historical and current aspects of civil engineering. Seniors only. 2 s.h. (w) *Palmer*

CE 148.* Structural Engineering. Structural design utilizing metals, concrete and timber. Planning, preliminary design, organization of design procedures and specifications. Prerequisites: CE 132 and CE 133. 3 s.h. (w) *Palmer*

CE 154.* Geometric Thoroughfare Design. Analysis and design of municipal street systems. Origin-destination surveys; control of traffic

* Offered only upon sufficient demand; enrollment limited.

flow; grade, rotary, and grade-separation intersections. Prerequisite: CE 113. 3 s.h. (w) *Staff*

CE 201.* *Advanced Mechanics of Materials.* Analysis of structural elements described by ordinary differential equations, such as beams on an elastic foundation, curved beams, beam-columns, circular plates; introduction to plates and shells; energy principles and their use in structural analysis. 3 units. (w) *Hill*

CE 202.* *Experimental Stress Analysis.* The experimental analysis of stress and strain in deformable bodies, correlation of theory with data from experiments; photoelasticity; strain gages; dimensional analysis and similitude principles of models. 3 units. (w) *Hill*

CE 205.* *Applied Elasticity.* Introduction to linear theory of elasticity; solutions of two-dimensional problems; three-dimensional problems of torsion and bending; stress concentrations; energy and variational principles with applications to design. 3 units. (w) *Meriam*

CE 211.* *Mechanical Behavior of Materials.* Macroscopic mechanical properties of materials for static, fatigue, dynamic and creep conditions; impact, shock, and stress wave properties; temperature, creep, viscoelastic and relaxation properties. 3 units. (w) *Kumar*

CE 221.* *Incompressible Fluid Flow.* Steady and unsteady pipe flow, theories of turbulent flow; water hammer theory and control; surge tanks; air chambers; the analysis and control of fluid systems; effect of resistance; tapered conductors. 3 units. (w) *Wood*

CE 231.* *Structural Engineering.* The application of the fundamental theories of structural action to the design and analysis of structural members; specifications. 3 units. (w) *Brown*

CE 232.* *Reinforced Concrete Design.* Design and analysis of reinforced concrete members including the influence of shrinkage and plastic flow; bond and diagonal tension; prestressed concrete members. 3 units. (w) *Brown*

CE 235.* *Foundation Engineering.* An introduction to methods of analysis, design and construction of foundations. Bearing capacity and settlement of shallow and deep foundations. Soil exploration; excavation and bracing; drainage and stabilization; underpinning. Foundation vibrations. 3 units. (w) *Vesic*

CE 243, 244.* *Sanitary Engineering Unit Operations and Process Design.* Fundamental bases for design of water and waste treatment systems, including transport, mixing, sedimentation and filtration, gas transfer, coagulation, and bio-treatment processes. 6 units. (w) *Bryan*

CE 250.* *Engineering Analysis.* General concepts of the solutions of engineering problems with special emphasis on digital and analog computer and numerical methods; deflection and stability; torsion of non-circular beams and multicelled thin-walled structures; vibrations of beams

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and membranes; structures with both uniform and nonuniform properties and with rigid and nonrigid supports. 3 units. (w) *Barton and Wood*

The Department offers work leading to graduation with distinction. See the section on Honors.

Electrical Engineering

Professor Wilson, *Chairman*; Professor Meier, *Director of Undergraduate Studies*; Professors Artley, Owen, and Vail; Associate Professors Kerr, Kraybill, and Wells; Adjunct Associate Professor Burger; Assistant Professors George, Hacker, and Pilkington; Lecturers Olive, Trickey, and Wortman; Visiting Lecturers Hampikian and Ross; Messrs. Barnes, Buckley, Bumgardner, Feng, Frekko, Plumer, and Rechten

EE 53. *Electrical Engineering Fundamentals.* Survey of electrical engineering profession: role of engineering and professional engineering societies in national life; engineering economy; engineering law; technical engineering problems; basic philosophy of engineering education; introduction of staff, curriculum, and facilities of Department of Electrical Engineering. One two-hour session. 1 s.h. (w) *Kraybill and Meier*

EE 55. *Electric Networks I.* Physical nature of circuit parameters and sources of excitation; volt-ampere relations for circuit elements; network topology; network equations using loop currents and node voltages; solutions of network differential equations by classical and transform methods. Concurrent: Mathematics 63 and Physics 41. Three class sessions and one two-hour computation. 4 s.h. (w) *George and Hacker*

EE 56. *Electric Networks II.* Network impedance and admittance functions; steady-state response to sinusoidal forcing; Fourier series analysis; pole-zero analysis of networks; matrices in network analysis; introduction to synthesis of reactance networks. Prerequisite: EE 55. Concurrent: Mathematics 64. Three class sessions and one two-hour computation. 4 s.h. (w) *George and Hacker*

EE 109-110. *Electromagnetic Systems.* Mathematical and physical consideration of energy relations and forces associated with both discrete particles and materials in electromagnetic fields: vector notation; Maxwell's equations; static and quasi-static fields; energy, power flow, and impedance; particle ballistics; electron emission; control of conduction in vacuums, gases, liquids, and solids; resistance, capacitance, and inductance of systems of conductors; forces between relatively moving bodies; dielectric and magnetic material. Prerequisite: EE 56. Concurrent: Mathematics 111. Three class sessions and one two-hour computation. 8 s.h. (w) *Artley and Vail*

EE 111-112. *Electrical Principles Laboratory.* Instruction in electrical laboratory techniques; experimental study of basic principles of electromagnetics, electronics, and electric and magnetic circuits. Prerequisite:

EE 56. Concurrent: EE 109-110. Two three-hour laboratory periods throughout first semester; one throughout second semester. 3 s.h. (w) *Barnes, Frekko, and Plumer*

EE 123. *Fundamentals of Electrical Engineering*. Introductory treatment of electrical engineering fundamentals for students majoring in other branches of engineering; principles of electric circuits, fields, and electronics. Prerequisites: Mathematics 63 and Physics 42. Concurrent: EE 125. Three class sessions. 3 s.h. (w) *Kerr, Meier, and Trickey*

EE 124. *Industrial Electrical Engineering*. Introductory treatment of industrial applications of electrical engineering fundamentals for students majoring in other branches of engineering; alternating- and direct-current machinery; electronic and electromagnetic control systems; illumination principles. Prerequisite: EE 123. Concurrent: EE 126. Three class sessions. 3 s.h. (w) *Kerr and Trickey*

EE 125. *Electrical Fundamentals Laboratory*. Laboratory course paralleling course EE 123, with which it should be taken concurrently. One three-hour laboratory. 1 s.h. (w) *Bumgardner and Plumer*

EE 126. *Industrial Electrical Laboratory*. Laboratory course paralleling course EE 124, with which it should be taken concurrently. One three-hour laboratory. 1 s.h. (w) *Bumgardner and Plumer*

EE 127.* *Electronics for Engineers*. Introductory treatment of principles and applications of engineering electronics for students majoring in other branches of engineering; amplifiers; feedback; basic communications and control circuits; electronic computers. Prerequisite: EE 123 and permission of instructor. Three class sessions. 3 s.h. (w) *Staff*

EE 159.* *Transmission*. Development of theory underlying transmission of electric energy over conductors at both power and communication frequencies. Two class sessions and one two-hour computation. Prerequisite: EE 110, Mathematics 111. Elective for electrical engineering majors. 3 s.h. (w) *Staff*

EE 165-166. *Electrical Engineering Seminar*. A course which provides an opportunity to consider matters related to the professional practice of electrical engineering; to relate the undergraduate program of studies to current practice; and to improve the ability to communicate more effectively, both in verbal and written form, particularly with regard to technical material. One class session. 2 s.h. (w) *Staff*

EE 173-174.* *Projects in Electrical Engineering*. A course which may be undertaken only by seniors who show special aptitude, or who may have had previous experience directly related to the proposed project. The consent of the Chairman of the Department must be obtained before registering. Elective for electrical majors. 3-6 s.h. (w) *Staff*

EE 177.* *Energy Transmission and Radiation*. A more advanced treatment of electromagnetic theory than is afforded by EE 109-119, with particular application to wave guides and antennas. Prerequisite: EE 110

* Offered only upon sufficient demand; enrollment limited.

and permission of instructor. Three class sessions. 3 s.h. (w) *Artley*

EE 179.* *Advanced Electrical Measurements.* Theory and practice of measurements of electrical quantities at extremes of voltage, current, power, and frequency. Two class sessions and one three-hour laboratory. Prerequisite: EE 110 and permission of instructor. 3 s.h. (w) *Owen*

EE 181-182. *Electronic Networks.* Advanced topics in engineering electronics: piece-wise linear approximation for nonlinear operation and incremental models for linear operation of basic electronic circuits; narrow- and wide-band amplifiers; feedback amplifiers; oscillators; modulation and demodulation; microwave devices; communication systems. Prerequisite: EE 110. Concurrent: EE 183-184. Three class sessions. 6 s.h. (w) *George and Owen*

EE 183-184. *Electronics Laboratory.* Laboratory course paralleling and integrated with course EE 181-182, with which it should be taken concurrently. One three-hour laboratory. 2 s.h. (w) *Feng and Rechten*

EE 191-192. *Electric Machinery.* Application of circuit and field principles to underlying theory of static and rotating electric machinery; mathematical techniques for analyzing transformers and electromechanical energy converters as individual devices and when interconnected into systems. Prerequisite: EE 110. Concurrent: EE 193-194. Three class sessions. 6 s.h. (w) *Meier and Trickey*

EE 193-194. *Energy Conversion Laboratory.* Selected experiments in energy conversion combining the theory and practice of transformers, electro-mechanical devices including motors and generators, photovoltaic sources, thermo-electric generators, static d-c to a-c and d-c to d-c converters. Prerequisite: EE 112. Concurrent: EE 191-192. 2 s.h. (w) *Bumgardner, Trickey, and Rechten*

EE 195.* *Nuclear Engineering Fundamentals.* Review of nuclear physics; fission and the chain reaction; nuclear reactor principles and concepts; materials, instrumentation, and control of nuclear reactors; selected topics in nuclear engineering. Prerequisite: permission of instructor. 3 s.h. (w) *Meier and Wortman*

EE 197. *Solid-State Materials.* Prediction and explanation of the response of ferroelectric, ferromagnetic, ferrimagnetic, and semiconductor materials to thermal, electric, magnetic and stress fields. Exploration of possibilities of improving the materials. Two class sessions and one three-hour laboratory. Prerequisites: Mathematics 111 and one course from among Physics 161, EE 110, CE 118, and ME 59. 3 s.h. (w) *Pilkington*

EE 199.* *Linear Feedback Systems.* Analysis and design of linear; continuous-data feedback control systems; stability tests; time and frequency domain methods; root locus method; performance specifications; study of electrical, mechanical, hydraulic, aerodynamic, pneumatic, and thermal systems. Two class sessions and one three-hour laboratory. Prerequisite: permission of instructor. 3 s.h. (w) *Wells*

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EE 201. *Energy Systems.* Application of general energy concepts to specific engineering devices and systems; use of mathematical models to describe concepts of energy storage, transfer, transformation, and control that are applicable to electromagnetic, mechanical, fluid, and thermal systems; the Lagrangian, Hamiltonian formulation, and tensors. Prerequisite: permission of instructor. 3 units. (w) *Artley*

EE 203, 204. *Information Systems.* General concepts of information storage, transfer, and processing; information theory, coding, noise theory, and response of information-handling systems in the time and frequency domains. Applications of information concepts to specific engineering situations: modulation, sampling, optimum filtering, detection in presence of noise, and comparisons of various systems. Prerequisite: permission of instructor. 6 units. (w) *Owen, Kerr, and George*

EE 207.* *Network Synthesis.* Linear network theory, including a review of time and frequency domain analysis; network graphs; network functions and realizability conditions; driving point impedance synthesis of passive networks; driving point and transfer specifications; approximation methods. Prerequisite: permission of instructor. 3 units. (w) *Owen and Vail*

EE 211. *Solid-State Theory.* The fundamental theory of wave motion in solids, including wave mechanics; variational method; perturbation theory; many-electron problems; one-electron approximation; free-electron approximation; electron spin; Brillouin zones; time-dependent Schrödinger's equation; and transition probabilities. Introduction to the thermodynamics of solids, including Maxwell-Boltzmann, Bose-Einstein, and Fermi-Dirac statistics; ensembles; entropy; and free-energy functions. Prerequisite: permission of instructor. 3 units. (w) *Artley, Burger Hacker, Pilkington, and Vail*

EE 212. *Solid-State Materials.* Concepts of solid state physics as applied to engineering materials: electrical, magnetic, thermal, and mechanical properties of solids; dielectrics; ferroelectrics; semiconductors; magnetic materials; and superconductors. Prerequisite: EE 211. 3 units. (w) *Artley, Burger, Hacker, Pilkington, and Vail*

EE 222. *Nonlinear Analysis.* Introduction to methods of analyzing engineering systems described by nonlinear differential equations: analytic, numerical, graphical, and series approximation methods; analysis of singular points; stability of nonlinear systems. Application of various methods, such as the modified Euler, Runge-Kutta, isoclines, perturbation, reversion, variation of parameters, residuals, harmonic balance, Bendixon, and Liapounov to phenomena of nonlinear resonance, subharmonics, relaxation oscillations, and forced oscillating systems. Prerequisite: permission of instructor. 3 units. (w) *Wilson*

EE 231.* *Nuclear Engineering.* Review of nuclear physics; fission and the chain reaction; nuclear reactor principles; materials, instrumentation,

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and control of nuclear reactors; selected applications and techniques of nuclear engineering. Prerequisite: permission of instructor. 3 units. (w) *Meier*

EE 241.* *Feedback Control Systems.* Analysis and design of linear sampled-data systems; linear systems subjected to random inputs; analytical design using mean square error and integral square error criteria; non-stationary and nonlinear systems. Prerequisite: permission of instructor. 3 units. (w) *Wells and Wilson*

EE 259.* *Advanced Electric Energy Conversion.* Equations of motion of electromechanical systems, fields and lumped parameters, state function concepts; mathematical techniques for analyzing electromechanical devices and systems; transducers; unified treatment employing matrix, tensor, and block-diagram concepts to obtain response under static and dynamic conditions; the generalized rotating machine. Prerequisite: permission of instructor. 3 units (w) *Meier, Trickey, and Wilson*

The Department offers work leading to graduation with distinction. See the section on Honors.

Mechanical Engineering

Professor Kenyon, *Acting Chairman and Director of Undergraduate Studies*; Professors Linderoth, Macduff and Meriam; Associate Professors Boyle, Elsevier, Harman, and Pearsall; Assistant Professors Buzzard, Lewis, and Nash; Visiting Professor Djordjevic; Visiting Lecturer Bock; Messrs. Biggers, Brealey, Cheng, Crist, Kim, V. Kumar and Wyatt

ME 52. *Kinematics, Kinetics.* Analytical and graphical studies of displacement, velocity, and acceleration in mechanical elements and systems. Synthesis and analysis of mechanisms for machines. Prerequisite: Engrg 2. Concurrent: Phys 41, Math 63. 3 s.h. (w) *Nash*

ME 59. *Materials and Processes.* Elementary metallurgy and introduction to modern theories of the solid state; selection and properties of engineering materials and effect of forming processes upon properties. Prerequisite: senior standing. 3 s.h. (w) *Pearsall*

ME 101-102. *Engineering Thermodynamics.* A basic study of the laws of thermodynamics and their use in engineering analysis and design. Properties of pure substances; vapor cycles; fluid flow; thermodynamic machinery; introduction to combustion processes. Prerequisite: Chem 1. Phys 42. Concurrent: Math 64. 6 s.h. (w) *Boyle, Harman, and Kenyon*

ME 103. *Thermodynamics.* A terminal course in thermodynamics and its engineering applications for civil and electrical engineering students. The basic laws of thermodynamics; gases; vapors; elements of combustion and heat transfer. Prerequisite: Chem 1, Phys 42. Concurrent: Math 64. 3 s.h. (w) *Elsevier*

* Offered only upon sufficient demand; enrollment limited.

ME 105. *Dynamics of Fluids.* A study of liquids at rest and in motion. Principles of laminar and turbulent flow through pipes, orifices, nozzles, and metering devices; impulse and momentum concepts; vortex action, pumps, turbines and fluid couplings; resistance of immersed and floating bodies. Prerequisite: Phys 41, Math 63. 3 s.h. (w) *Buzzard*

ME 106. *Heat Transfer.* A basic course covering the elements of radiation, conduction, and convection. Methods of temperature measurement, steady and transient heat flow, analytical and numerical methods. Concurrent: ME 101, 105; Math 64. 3 s.h. (w) *Buzzard*

ME 114. *Junior Mechanical Engineering Laboratory.* Measurement of mechanical and thermodynamic properties of systems. Student planning and reporting of laboratory experiments in temperature, pressure, velocity, acceleration, flow, energy and power measurements. Prerequisite: ME 101, 105. 2 s.h. (w) *Staff*

ME 116. *Mechanical Engineering Laboratory.* Primarily for civil and electrical engineering students. Selected laboratory experiments in measuring mechanical and thermodynamics properties of systems. Student planning of experiments in temperature, pressure, velocity, acceleration, flow, energy and power measurements. Concurrent: ME 103. 1 s.h. (w) *Staff*

ME 128.* *Dynamics of Gases.* The flow of compressible fluids at high velocities. One-dimensional compressible flow; area change; normal shock; friction and heat transfer; Mach number. Prerequisite: ME 102. Concurrent: ME 106. 3 s.h. (w) *Staff*

ME 141. *Machine Design.* Elements of mechanism with special attention to the role of invention in mechanical design. Velocity and acceleration in mechanisms from both scalar and vector viewpoints. Prerequisite: Math 63. Concurrent: ME 52, E 57 or 60. 3 s.h. (w) *Djordjevic and Linderoth*

ME 142. *Machine Design.* Continuation of ME 141. Static and dynamic forces in machinery. The instant center; theory of gear tooth profiles. Design of machine elements, such as gears, springs, and bearings; complex parts. Prerequisite: ME 141. Concurrent E 107. 3 s.h. (w) *Djordjevic and Linderoth*

ME 153.* *Heating, Air Conditioning, and Refrigeration.* Principles of thermodynamics, heat transfer, and fluid flow applied to comfort and industrial air conditioning. Cycles and equipment for heating, cooling, and humidity control. Air transmission and distribution. Modern vapor compression, absorption and low temperature refrigeration cycles and systems. Prerequisite: ME 102 and 106. 3 s.h. (w) *Elsevier*

ME 156. *Combustion Engines.* A study of cycles, fuels, and fuel mixtures in piston, ram jet, and rocket engines. Comparison of real and theoretical cycles; carburetion and fuel injection systems; modern developments. Prerequisite: ME 102. 3 s.h. (w) *Elsevier*

* Offered only upon sufficient demand; enrollment limited.

ME 157.* *Pumps, Compressors and Turbines.* An introduction to the theory and design of centrifugal pumps and compressors, axial-flow compressors, impulse and reaction turbines, and gas turbine plants, combustion systems and regenerators. Concurrent: ME 102 and 106. 3 s.h. (w) *Boyle*

ME 159-160. *Senior Mechanical Engineering Laboratory.* Laboratory determination of heat flow and operating characteristics of engines, fans, pumps, and other power and refrigeration plant components; vibrational systems, control systems, analog methods. Student planning and reporting of original experiments. 2 s.h. (w) *Staff*

ME 162. *Power Plants.* Basic concepts of thermodynamics, heat transfer and fluid flow are combined with industrial data for the consideration of real power plant problems. Selection of steam generators, prime movers, fans, pumps, heaters, and piping systems with regard to engineering and economic points of view. Prerequisite: ME 102. 3 s.h. (w) *Harman*

ME 163.* *Vibration Control.* An introduction to the dynamics of mechanical systems; equilibrium, stability lumped and distributed systems, cradle and field balancing. System analysis by classical differential equations, mechanical impedance, operational calculus and analog simulation. Prerequisite: Math 64. ME 141. 3 s.h. (w) *Macduff*

ME 164.* *Engineering Analysis.* A study of a series of engineering problems with particular reference to mathematical and graphical methods of solution and engineering interpretation of results. Concurrent: Math 64. 3 s.h. (w) *Boyle*

ME 166. *Air Conditioning Design.* Typical air conditioning systems considered in relation to specific problems. Equipment analysis and performance, economic considerations, system control and response, noise generation and attenuation. Prerequisite: ME 153. 3 s.h. (w) *Elsevier*

ME 167.* *Industrial Engineering.* A study of the organization and functioning of industries; function of engineering in industry; job analysis and self evaluation; professional and executive responsibility of the mechanical engineer. Prerequisite: senior standing. 3 s.h. (w) *Lewis*

ME 168.* *Industrial Engineering Production Methods.* Study of engineering theory, methods and controls in production. Methods, motion and time study, plant lay-out, production and quality control, industrial safety, operations research. Prerequisite: senior standing, ME 167 or equivalent. 3 s.h. (w) *Lewis*

ME 171. *Response of Physical Systems.* An introduction to the basic fundamentals of instrumentation and of the control of processes and systems with emphasis on correlation of analysis and experimental results. Prerequisite: Math 111. 3 s.h. (w) *Macduff*

ME 173-174. *Mechanical Engineering Seminar.* A course designed to keep the students abreast of progress in the engineering field and to

* Offered only upon sufficient demand; enrollment limited.

develop their ability to express ideas effectively in speech and writing. Open to seniors only. 2 s.h. (w) *Staff*

ME 182.* *Fundamentals of Nuclear Engineering.* Review of nuclear physics, nuclear interactions and cross sections, neutron induced chain reactions, shielding, hazards, isotope utilizations, reactor systems and power reactors. Prerequisite: permission of instructor. 3 s.h. (w) *Kenyon*

ME 197-198. *Projects in Mechanical Engineering.* This course may be assigned by the Chairman of the Department to outstanding seniors who express a desire for such work and who have shown aptitude for research in one distinct field of mechanical engineering. Prerequisite: 3.0 average and senior standing. 1-6 s.h. (w) *Staff*

ME 201.* *Theoretical and Applied Mechanics.* Introduction to the theory of elasticity and vibration analysis. 3 units. (w) *Meriam*

ME 202.* *Theoretical Thermodynamics.* Classical thermodynamics based on the First, Second, and Third Laws of Thermodynamics. Classical and statistical thermodynamics of ideal gases. Properties of real gases, equilibrium, combustion, and irreversible processes. 3 units. (w) *Harman*

ME 221.* *Analysis of Incompressible and Compressible Fluid Flow.* Flow of incompressible and compressible fluids; concepts of subsonic, sonic and supersonic flow; experimental methods. 3 units. (w) *Harman*

ME 222.* *Analysis of Heat Transfer.* Heat transfer by conduction, convection, and radiation; lumped and distributed heat capacity, resistance, losses; steady and transient flow. 3 units. (w) *Buzzard*

ME 231-232.* *Systems Engineering.* Methods of obtaining parameters for strength, response, and stability studies of mechanical systems. Impedance and operational means of analysis; mechanical and electronic analogs; nonlinear theories. 6 units. (w) *Macduff*

ME 265.* *Advanced Topics in Mechanical Engineering.* Opportunity for study of advanced subjects related to programs within mechanical engineering tailored to fit the requirements of a small group. Prerequisite: approval of the Director of Graduate Studies and of instructor under whom work will be done. 1 to 3 units. (w) *Members of the Graduate Staff*

ME 280.* *Nuclear Reactor Power Cycles.* Introduction to basic reactor principles and reactor types. Consideration of thermodynamic cycles for nuclear reactors for stationary and mobile plants. Analysis of fluid flow and heat transfer problems unique to reactors with development of methods of reactor safety techniques. Metallurgical problems peculiar to reactor design. 3 units. (w) *Kenyon*

The Department offers work leading to graduation with distinction. See the section on Honors.

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The Divinity School



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General Information

Historical Statement

The indenture of Trust signed on December 11, 1924, by Mr. James B. Duke, which established Duke University, mentioned first among its objects the training of ministers of the Gospel. The Divinity School was, accordingly, the first of the graduate professional schools to be organized. Its work began with the year 1926-1927, the formal opening exercises being held on November 9, 1926.

The Reverend Doctor Edmund Davison Soper was the first Dean of the Divinity School. He resigned in 1928 to become President of Ohio Wesleyan University, and was succeeded by the Reverend Doctor Elbert Russell, and the latter in turn in 1941 by the Reverend Doctor Paul Neff Garber. In 1944, Dean Garber was elected to the episcopacy of The Methodist Church, and Doctor Harvie Branscomb assumed the duties of the Dean's office. In 1946, Dean Branscomb became Chancellor of Vanderbilt University, and in 1947 the Reverend Doctor Paul E. Root was elected Dean but died before he could assume the office. The Reverend Doctor Harold A. Bosley became Dean in 1947 and resigned in 1950 to become the pastor of the First Methodist Church, Evanston, Ill. The Reverend Doctor James Cannon was appointed Dean of the Divinity School, March 1, 1951. After a period marked by important administrative integration of the School, Doctor Cannon resigned the duties of deanship, September 30, 1958. The Reverend Professor Robert Earl

Cushman was elected Dean and assumed the responsibilities of the office on October 1, 1958.

The Purpose of the Divinity School

The primary purpose of the Divinity School is to provide training for properly qualified persons planning to enter the Christian ministry. This includes not only prospective ministers in local churches, but also those preparing themselves to be missionaries at home and abroad, ministers of Christian Education, teachers of religion, and chaplains. Vital to all of these forms of service is a full understanding of the beginnings, content, and history of the Christian faith and its special pertinence for the spiritual needs of the modern world. Studies of a broad and thorough character directed toward such an understanding constitute the center of the curriculum of the Divinity School and are regarded as the basic training for all prospective Christian ministers. Specific instruction in the skills required of local ministers and of leaders in the work of Christian Education is also provided. As funds become available for the purpose and as needs appear, additional training in specialized skills and areas of knowledge will be added to the curriculum.

Bound by ties of history and obligation to The Methodist Church, the Divinity School is ecumenical in its interests and outlook. Its faculty is limited to no one denomination, but draws upon the resources of them all. Students of the several denominations are admitted on an equal basis. The Divinity School conceives its task to be one of broad service to the Church in all of its forms.

The Relation of the Divinity School to Duke University

The Divinity School is an integral part of the University and shares fully in its activities, privileges, and responsibilities. The Sunday services in the University Chapel give Divinity School students an opportunity to hear each year a number of leading ministers of the country. The University Libraries make easily accessible a rich collection of 1,750,000 volumes. Selected courses in the Graduate School of Arts and Sciences and in the professional schools are open to Divinity School students without payment of additional fees. The general cultural and recreational resources of the University are available to them on the same basis as to other students.

Courses of Study Offered by the Divinity School

The Divinity School offers three courses of study. The basic course is that which leads to the degree of Bachelor of Divinity. This is a three-

year course and is recommended to all those preparing themselves for the work of the parish ministry. Students who hold pastoral charges, or other remunerative work requiring any substantial time apart from their studies, may carry only reduced schedules of work, and, in most cases, unless work is taken in the Duke University Summer Session, will spend four years in completion of the requirements for the B.D. degree.

The Divinity School offers study leading to the degree of Master of Religious Education. This course is designed for persons who wish to take specialized positions in the work of Christian Education. The course does not provide a general preparation for the work of the regular ministry and cannot serve as a substitute for it. No exchange of credits between the two courses is permitted, nor can departmental courses taken be credited toward more than one degree.

A new program of study leading to the degree of Master of Theology (Th.M.) was instituted in the academic year 1960-1961. This course is planned to afford a limited number of superior students an opportunity for intensive theological study beyond the B.D. degree. It is a terminal professional degree, ordinarily to be completed in a year, and not to be regarded as leading toward a doctorate.

The requirements for each of these degrees are stated on pages 20 through 35 of this catalogue.

Courses of Study in Religion Offered by the Graduate School of Arts and Sciences

Students who desire to pursue studies in religion leading to the degrees of Master of Arts or Doctor of Philosophy in Religion should register in the Graduate School of Arts and Sciences. Study and research may be pursued in three fields: (1) Biblical Studies; (2) Historical Studies; and (3) Systematic and Contemporary Studies. A list of courses approved by the Graduate School faculty for work in these fields, together with general requirements for admission to the Graduate School, may be found in the *Bulletin of the Graduate School*. This Bulletin is available on application to the Dean of the Graduate School of Arts and Sciences, Duke University.

Graduate students in religion are eligible for financial support under a regular University Fellowship, a Gurney Harriss Kearns Fellowship in Religion, administered by the Graduate School, or for one of the National Foundation fellowships such as Rockefeller, Woodrow Wilson, or Danforth. Applications for fellowships administered by Duke University should be submitted to the Dean of the Graduate School by February 15.

Inquiries concerning specific requirements of the Program of Religion in the Graduate School should be addressed to Professor Waldo Beach, Director of Graduate Studies in Religion.

Facilities for Study

Library Resources

Divinity School Library

The Divinity School Library, containing a collection of more than 125,000 volumes in the field of religion and closely related disciplines, affords an unusual wealth of material for the seminary student. Although it is an integral part of the University's nine-unit library system which possesses more than 1,750,000 books, the Divinity School Library has its own separate facilities in the Divinity School building. Its book collection is operated on the open stack system, and its reading room provides study facilities for students, housing space for the special reference collection in religion, and for the current numbers of the more than 460 religious periodicals to which the Library subscribes.

Staffed by a librarian and a reference librarian who are trained in theology as well as in library administration, and by a circulation staff of two persons aided by a number of student assistants, the Divinity School Library offers a variety of reference services to assist the student in selecting and locating materials. The staff, in cooperation with the faculty, maintains a book and periodical collection to support both basic courses and advanced research in all major fields of religious studies.

The Divinity School Library is adjacent to the General Library and is internally connected with it by a corridor which gives easy access to its many departments. The seminary student is permitted to withdraw books from the collection of more than 1,000,000 volumes in the General Library, and to make use of its other resources and facilities which include manuscripts, archives, public documents, newspapers, periodicals, microfilm, maps, rare materials (among which are thirty prized ancient Greek manuscripts), reference assistance, and provision for the borrowing of books not in the Duke Libraries from the Library of the University of North Carolina and other institutions.

Ormond Memorial Fund

Established in 1924 by Dr. J. M. Ormond, '02, and Mrs. Ormond, in memory of his mother and father, Mr. and Mrs. J. J. Ormond, the income from the Ormond Memorial Fund is to be used for the purchase of a collection of books on the rural church for the Library of the Divinity School at Duke University.

Avera Bible Fund

Established in 1895 by gift of Mrs. L. B. McCullers in memory of her

husband, Willis H. Avera, the fund provides for the purchase of books to be used for the Divinity School Library.

Louis W. Bailey Memorial Fund

This memorial fund was established in 1958 by the Reverend A. Purnell Bailey in memory of his father. The income is to be used for books for the Divinity School Library.

The William Arthur Kale, Jr., Memorial Fund

William Arthur Kale, Jr. was a member of the Duke University class of 1958, a lover of sacred art and music, and a member of the University Chapel Choir. In his memory, there was established in 1964, by the provision of his parents, Professor and Mrs. William Arthur Kale, Sr., a fund for the purchase of books and other materials in the area of fine arts and religious musicology for the perpetual enrichment of the holdings of the Divinity School Library.

Corporate Worship

One of the most important aspects of a program of training for Christian service is warm and discriminating common prayer. The center of the corporate life of the Divinity School is its own place of worship, York Chapel. Regular chapel services are held, at which all students are expected to be present. Services are led by members of the faculty, by visiting ministers, and by members of the student body. Prayer groups are held in the dormitories weekly and special groups during the Lenten Season.

Public Lectures

The Committee on Lectures and Public Events presented the following lecturers (with their topics) during the year 1965-66: Professor Franklin W. Young, Chairman of the Graduate Department of Religion, Princeton University ("The New Testament and Worship"); Dr. Joachim Jeremias, Professor of New Testament, Göttingen University, Germany ("Some Characteristics of Jesus' Way of Speaking"); Dr. Hans Frei, Associate Professor of Religious Studies, Yale University ("The Quest for Christ's Presence in T. S. Eliot's 'Murder in the Cathedral'"); Dr. Alexander A. Di Lella, O.F.M., Professor of Old Testament and N. T. Greek, Holy Name

College, Washington, D.C. ("Conservative and Progressive Theology in the Apocrypha"); The Reverend Dr. Alan F. Geyer, Executive Secretary, the Council for Social Action of the United Church of Christ ("Christianity and Political Ethics"); Mr. William Stringfellow, Counsellor at Law, New York City ("Redemptive Love"). The fifth Faculty Lecture was delivered by Professor Frank Baker ("John Wesley's First Wife").

Lectures and Symposia

The James A. Gray Lectureship

The James A. Gray Lectures were established in 1950 as part of the fund set up in 1947 by Mr. James A. Gray of Winston-Salem, North Carolina. This lectureship was once again delivered in connection with the Ministers' Convocation, held at the University in the Fall of 1965. The lecturer was The Reverend Doctor H. Shelton Smith, James B. Duke Professor Emeritus of American Thought, Duke Divinity School. His subject was: "The Role of the Southern Churchman in the Struggle for Justice and Equality: 1820-1965." The lectures will be published.

The Divinity School Library Lectureship

In 1948 the Duke Divinity School Library Lectures were established by the Reverend George Brinkmann Ehllhardt for the purpose of bringing to the Divinity School a succession of religious leaders. The lecturer for 1965-66 was Dr. Elizabeth Sewell, author and poet, of Newnham College, Cambridge University, England.

Symposium of Christian Missions

Each year, in collaboration with the Methodist Board of Missions, the Divinity School presents a team of distinguished participants in the world mission of the Church, usually including a secretary of missionary personnel and a Duke alumnus serving overseas. The general aims are "to inform students and faculty of the philosophy and work of missions as seen through the personal experience of speakers; to educate present and future ministers so that they will have a vital concern for the promotion of missionary education in the local church; and to evaluate the missionary enterprise as a significant force in the revolutionary world." The featured speaker in 1966 was Mrs. Porter Brown, General Secretary of the Methodist Board of Missions; the alumnus was the Rev. George Ogle, '54, of Korea.

Programs of Continuing Education

Divinity School Seminars

The Divinity School, with the support of the James A. Gray Fund, conducts each year a series of extension seminars consisting of two-day study courses for Divinity School alumni and other ministers. In 1965-66 three seminars were held as follows: Columbia, S. C., in College Place Methodist Church (November 15-16, 1965); Gastonia, N. C., in First Methodist Church (January 17-18, 1966); and Goldsboro, N. C., in St. Paul Methodist Church (January 19-20, 1966). The subject presented in all three Seminars was "Moral Responsibility and the Christian."

Lecturers were Dr. Hans W. Frei, Associate Professor of Religious Studies in Yale University; Dr. Donald W. Shriver, Jr., Assistant Professor of Social Studies and Director of the Experimental Study of Religion and Society in North Carolina State University at Raleigh; and Dr. William H. Poteat, Associate Professor of Christianity and Culture in the Divinity School of Duke University.

Projected for 1966-67 are seminars in Florence, S.C., Charlotte, N.C., Wilson, N. C., and (for the first time) Richmond, Va. The subject will be: "The Sequel to Vatican II." Dean Robert E. Cushman, Observer at the sessions of Vatican II, will lead a team of specialists in these seminars.

The Henry Harrison Jordan Loan Library

Henry Harrison Jordan, distinguished member of the Western North Carolina Conference (1862-1931) was memorialized by his children in the establishment of an endowment in 1947. The Divinity School librarian is the custodian of books purchased under this fund for loan, through postal services, to qualified ministers of all denominations or localities. The Jordan Loan Library undertakes to maintain a catalogue of up-to-date publications representative of the several theological disciplines and areas of the minister's professional interest. Books are loaned on application to the librarian of the Divinity School from a printed catalogue supplied on request.

Duke Divinity School Summer Clinics

Four Summer Clinics in Church Planning and Development, Pastoral Care, Preaching, and Systematic Theology will be held simultaneously on July 18-29, 1966. These are designed to supplement Seminary education through two weeks of intensive training in one selected subject. Each clinic has its own leaders and schedule. However, the four groups will be together for special features, particularly the guest lectures of the second week. Registration is open to ministers of all denominations. Participants are expected to attend the full two weeks from the opening dinner to the closing luncheon. No academic credit is given. Please address requests for information, costs and financial aid to: Dr. M. Wilson Nesbitt, Director and Registrar, Box 4814, Duke Station, Durham, North Carolina.

Church Planning and Development

This Summer Clinic is designed to acquaint church leaders with the rationale and methodology of the "planning process," applying it to such church situations as church extension, conference structure, parish planning and programming, research-survey, and cooperative work both in urban and rural settings. *Dr. Daniel M. Schores, Jr., Faculty Chairman.*

Pastoral Care

The theme is the psychological and theological dimensions of selfhood. Through lectures, discussions, hospital visitation, and verbatim conferences, aspects of the theme are explored: the meaning of selfhood, the self in crisis and the ministry of the Church to those caught in the crisis of illness, the action of God in the midst of suffering, and the personal and sacramental means of grace. Hospital visitation supervised by the

Chaplains to the Duke Medical Center forms an integral part of the program. *Dr. Richard A. Goodling, Faculty Chairman.*

Preaching

This Clinic will focus on principal and practical aspects of sermon planning, preparation, and presentation, particularly in the area of sermon construction and delivery. Opportunity is provided for each participant to preach at least twice before a small group for criticism. Matters of common concern for preachers are discussed in plenary sessions. Registration is limited to eighteen members, preferably active ministers and chaplains, who have been out of the seminary five years or more. *Dr. James T. Cleland, Faculty Chairman.*

Systematic Theology

Discussion at this Clinic will treat current and controverted issues in present-day Protestant theology as these are illustrated by "radical" and "social change" theology. There will be lectures, assigned reading, group conferences. *Dr. Frederick Herzog, Faculty Chairman.*

The School for Supply Pastors

In cooperation with the Department of Ministerial Education of the Board of Education and the Southeastern Jurisdictional Conference of The Methodist Church, Professor W. A. Kale directs for the Divinity School a School for Supply Pastors of The Methodist Church and others taking the Methodist course of study for ministers. This school is in session for approximately four weeks each summer, and the required studies for one full year can be completed in this period. This is not a part of the regular work of the Divinity School and no credit toward a seminary degree can be earned. The faculty includes representatives from the Divinity School and other church-related institutions, plus selected leaders of nearby Annual Conferences. The eighteenth session of the Supply Pastors' School is scheduled for July 11-August 5, 1966.

Other Programs

Facilities for Advanced Study in the American Schools of Oriental Research

The Divinity School of Duke University is one of the supporting members of the American Schools of Oriental Research. Accordingly, students

in the Divinity School have the privilege of attending the American School in Jerusalem or the one in Bagdad without charge for tuition. They may also compete for the financial aids which are offered annually by these Schools, which consist of four fellowships, the stipends depending upon available funds.

Programs in Pastoral Care

Programs in Pastoral Care beyond the studies incorporated in the B.D. curriculum are provided in cooperation with the Duke University Medical Center, Murdoch Center in Butner, and Dorothea Dix Hospital in Raleigh. The staff for these programs consists of faculty members in Pastoral Care of the Divinity School and the Chaplains of the cooperating hospitals.

Five such special programs are available:

1. A quarter of Clinical Pastoral Training is available to a limited number of B.D. and post-B.D. students beginning the Monday nearest June 15 and continuing for twelve consecutive weeks. This quarter of training is accredited by the Institute of Pastoral Care, Inc.
2. The Master of Theology degree with a major in Pastoral Care is a calendar year program beginning June 15th, September 15th, or February 1st, and includes a summer quarter of clinical training full-time in one of the affiliated hospitals with such clinical training continuing on a half-time basis through the academic year. To the 14 credits the candidate receives for his clinical training are added 16 credits for course work in The Divinity School. (See pages 34 and 35 of *The Divinity School Bulletin* for 1966-67 for general requirements for the degree and course work in Pastoral Care.) Some money for tuition scholarship is available and several traineeships are provided through the cooperating hospitals.
3. A one-year certificate or non-degree program is available for a limited number of candidates who hold the B.D. degree. These candidates are enrolled as special students in The Divinity School and may take a course or two each semester but the focus of their training is clinical.
4. A second or residency year is available for those men who have either the Master's degree in Pastoral Care or have completed an internship year. The residency may be taken at any one of the three cooperating hospitals. Fellowships are available.
5. A two-week clinic in Pastoral Care is provided each summer as part of the Divinity School's in-service training program. See p. 8.

For further information concerning any of these programs write to Dr. Richard A. Goodling, Director, Programs in Pastoral Care, The Duke Divinity School.

Community Life

Divinity School Choir

A student organization of long standing is the Divinity School Choir. Membership in the Choir is open to all qualified students. The Choir sings regularly for the daily services in York Chapel and at special seasonal programs and services. New members are chosen by informal auditions held during the first week of fall classes. Auditions are arranged for all who are interested.

The Coordinating Council for Community Life

Beginning with the 1964-65 academic year, the Student Government Association was superseded by a Coordinating Council for Community Life. This Council is composed of representatives from the student body, faculty, administration, Divinity Dames, and the doctoral students in religion.

The purpose of the Council is, as the name implies, to coordinate the activities of the Divinity School community. Realizing that there are many shared interests and concerns within the community which cannot be expressed fully in a student body organization alone, the Council was

created by a joint student-faculty committee and approved by participating groups.

The shared interests and activities of the community are expressed through the several committees of the Council. The Council has coordinating, reviewing, and initiating powers in matters affecting the common life.

Student members of the Council are elected by the three B.D. classes, the M.R.E. candidates, the Th.M. candidates, and the student pastors. A student activity fee is collected at the beginning of each academic year to support the activities of the community. The fee, in recent years, has been six dollars (\$6.00). The funds are administered through committees and are spent on such projects as missions, social action, social events, and student publications.

Organizations

Divinity Dames

The wives of Divinity School students have an organization through which there is opportunity for informal fellowship during the period of the students' residency. For the past several years lecture courses, running for two-week periods in the fall and spring semesters, have provided instruction in various aspects of parish life and in theological and Biblical subjects and issues. The Dean and faculty are concerned to assist the wife to understand her husband's vocation and to participate appropriately.

The Duke Endowment Student Association

The Duke Endowment Student Association is the organization of students who participate in the Summer Field Education Program.

At least six meetings per year are held for the purpose of fellowship and preparation for the summer field education responsibilities.

Publications

The Duke Divinity School Review

Three times each year (Autumn, Winter, and Spring) the Divinity School publishes a magazine designed to acquaint its readers with current theological thinking through the inclusion of public addresses given at the school, scholarly articles by faculty members and others, and book

reviews. The *Review* is circulated free of charge to a mailing list of some 2,600, one-half of whom are alumni of the School and the other half are interested friends, campus ministers, teachers, administrators, and librarians.

Directory and Response

In cooperation with the Dean's Office, students publish a faculty and student *Directory*. A monthly paper entitled *Response* is published under their editorship.

Admission and Requirements for Degrees

Requirements and Procedures for Admission

The Divinity School is a fully accredited member of the American Association of Theological Schools, and is one of twelve accredited seminaries of The Methodist Church. Candidates for admission must hold the degree of A.B., or its equivalent, based upon four years of work beyond secondary education in a college which is approved by one of the regional accrediting bodies, and their college records must be such as to indicate their ability to carry on graduate professional studies. They will be admitted without examination on presentation of an official, satisfactory transcript of college and all other academic credits which they may have secured. Recommendations from five responsible persons are required. Women will be admitted on the same basis as men.

Applications are evaluated with a view both to the academic achievement of the candidate and with reference to his personal and professional qualifications for the Christian ministry. While an academic average of less than "B minus" is ordinarily regarded as a disqualification for admission, nevertheless, the Committee on Admissions is impressed with a rising curve of achievement in the undergraduate program and makes its decision on the basis of the whole body of credentials of an applicant, including supporting letters of reference.

The applications of students from foreign countries will be considered, each on its own merits, the general principle being that training equivalent to that of a baccalaureate degree from an accredited American college must have been secured.

In addition to an adequate academic preparation, applicants must satisfy the faculty as to their Christian character and purpose. A formal application blank may be secured from the office of the Divinity School. This must be filled out and returned by all candidates for admission. Applications received after May 1 cannot be assured of dormitory rooms for the ensuing academic year. *A minimum of thirty days is required to process any application, in many cases longer.*

No admission is final until approved by the Student Health Service, which requires a certificate of immunization and general health to be submitted not earlier than July 1 and not later than August 1.

Entering students are also required to take certain diversified tests administered by the Bureau of Testing and Guidance and by the Divinity School.

Persons who do not matriculate at the time for which they were originally admitted forfeit admission and must be formally readmitted. A student who withdraws from the Divinity School and desires to return at a later date must file with the Dean a written request for a leave of absence.

Applicants are expected on notification of admission to signify their acceptance within three weeks, and to pay an admission fee of \$30.00. (Make check payable to Duke University and send to the Office of the Dean of the Divinity School.) This fee is applied to the regular first-term bill if the student matriculates; if he fails to do so, the fee is forfeited. This does not apply to the Summer Session.

Under the terms of the Selective Service Act, as it now stands, pre-enrollment for later formal admission may be granted to persons who meet the Divinity School standards and requirements for admission. Applications for pre-enrollment may be addressed to the Office of the Dean. Pre-enrolled students must send transcripts of each year's college work by June 15th of each year in which they are pre-enrolled. Pre-enrollment does not guarantee final admission, and a person who has been pre-enrolled for any length of time must send a transcript of work by February 1 of the year in which admission is sought. This must be accompanied by a letter from the college dean or other approved reference certifying to continued academic acceptability and good character and conduct.

Recommended Pre-Seminary Curriculum

The following is regarded by the Association of American Theological Schools as a minimum list of fields with which it is desirable that a student

should have acquaintance before beginning study in seminary. These fields of study are selected because of the probability that they will lead in the direction of such results as have been indicated.

It is desirable that the student's work in these fields of study should be evaluated on the basis of his mastery of these fields rather than in terms of semester hours or credits. So that this recommendation may help the student faced with the practical problem of selecting courses, however, it is suggested that he take 30 semester courses or 90 semester hours or approximately three-fourths of his college work in the following specific areas:

English—literature, composition, speech, and related studies. At least 6 semesters.

History—ancient, modern European, and American. At least 3 semesters.

Philosophy—orientation in history, content, and method. At least 3 semesters.

Natural Sciences—preferably physics, chemistry, and biology. At least 2 semesters.

Social Sciences—psychology, sociology, economics, political science, and education. At least 6 semesters, including at least 1 semester of psychology.

Foreign languages—one or more of the following linguistic avenues to man's thought and tools of scholarly research: Latin, Greek, Hebrew, German, and French. Students who anticipate postgraduate studies are urged to undertake these disciplines early in their training as opportunity offers. At least 4 semesters.

Religion—a thorough knowledge of the content of the Bible is indispensable, together with an introduction to the major religious traditions and theological problems in the context of the principal aspects of human culture outlined above. The pre-seminary student may well seek counsel of the seminary of his choice in order most profitably to use the resources of his college. At least 3 semesters.

Of the various possible areas of concentration, where areas of concentration are required, English, philosophy, and history are regarded as the most desirable. (from *A.A.T.S. Bulletin*, 1964)

Transfer of Credit

Transfer of credit from theological schools accredited by the American Association of Theological Schools is provided for by the faculty of the Divinity School under certain conditions. Applications for transfer of credit will be ruled upon by the Committee on Admissions, and will be subject to evaluation in terms of the prevailing requirements of the Divinity School for graduation. *Ordinarily, credit from another institution will not be granted in amount exceeding one-half of the total credits*

required by the Divinity School for graduation. A student applying for transfer of credit in excess of this amount may be required to pass such examinations as the Committee on Admissions may prescribe. In each case a letter of honorable dismissal from the school from which transfer is made is required along with transcript of academic credits.

Advanced Standing

Advanced standing allows entering students to begin work in any given field at a level higher than that of the core curriculum, or to substitute a specialized or cognate course for a core requirement.

Entering students with substantial undergraduate preparation in areas closely related to required courses of the Divinity School core curriculum may be eligible for advanced standing. While a student may be eligible for advanced standing in any subject, it is especially pertinent where students offer undergraduate majors of superior quality in Bible, religion, or philosophy. Students entering with six or more semester hours in the Greek language should consult the *Bulletin* under "Language Study" for a description of special privileges pertaining to their case. The fields in which entering students, by virtue of previous undergraduate study, are most likely to qualify for advanced standing are: Old Testament, New Testament, Types of Religious Philosophy, and Church History.

An entering student who offers not less than six semester hours of college credit, with a grade of "B" or better in one or more of these areas, may ordinarily anticipate advanced standing in corresponding required courses of the Divinity School core curriculum. All final transcripts will be studied, and advanced standing will be accorded to those who qualify under this provision.

A student who offers not less than three semester hours of college credit with a grade of "B" or better in one or more of these areas may, for satisfactory performance in a qualifying examination in the discipline, be granted advanced standing. Entering students who qualify under this provision must, at the time of application, make request for the privilege of sitting for such an examination.

The core requirement for the entering junior student with advanced standing is ordinarily satisfied by one of the following substitutions:

For Old Testament 11: O.T. 101; 106 A, B, C, D; 196; 201; 202.

For New Testament 18: N.T. 103; 104; 105; 107; 109; 116 A, B, C; 117 A, B; 118; 119.

For Types of Religious Philosophy: C.C. 16.

For Church History 13: C.H. 137; 138; 331; 332.

For Church History 14: C.H. 85; 250; 330.

Admission on Probation

Applicants for admission who are graduates of non-accredited colleges will be considered on their merits. Ordinarily, such applicants must show that they have attained a superior average for a four-year college course. Admission of such persons will, in every case, be on probation.

Applicants for admission who are graduates of accredited colleges but whose college transcripts do not fully meet Divinity School standards may be admitted on probation if their recommendations otherwise justify admission.

Probation means:

1. Students who during the first year of Divinity School work maintain less than a "C" average, including one or more failures, ordinarily will be required to withdraw from the School.
2. Students admitted on probation may carry only limited schedules of work, the amount to be determined by the Dean of Students.
3. A student admitted on probation ordinarily shall not be admitted for advanced standing.

Students whose work after admission is not satisfactory may be placed on probation.

Ministerial and Professional Qualifications

All students who are admitted to academic study in the Divinity School are subject to the established order of administrative regulations of the University and the accepted standards of personal conduct it enjoins; continuance in the School is conditioned upon acknowledgment of and compliance with such regulations and standards.

In particular, the University and the Divinity School expect and require students in candidacy for degrees, leading to a ministerial vocation, not only to exemplify the dignity of their calling, but to exhibit attitude and conduct conformable with the recognized standards of their Christian profession. While no honor system relating to academic integrity is formalized within the Divinity School, application for and admission to the courses of study assume the student's assent to full compliance with recognized standards of integrity in the fulfillment of academic tasks.

On this prior understanding, therefore, the University reserves the right, and matriculation by the student is a concession to this right, to compel the withdrawal of any student whose conduct at any time is not satisfactory to the University, even though no specific charge is made against the student.

As a graduate professional school of theology, the Divinity School expects, on the part of the student, an increasing manifestation of maturity and professional purposiveness in discharge of personal and academic responsibilities appropriate to the level of advanced academic work lead-

ing to the high and exacting demands of the Christian ministry. Since personal and professional qualifications for the ministry will be considered in evaluating the candidacy of all students for degrees, students whose persons, progress, or development indicate that they are not suited to the work of the ministry will not be allowed to continue in the School.

English Deficiency

Students whose English testing scores show marked deficiency or who are reported by their instructors as deficient in English usage will be required to take Remedial English in addition to meeting other requirements for the Bachelor of Divinity degree.

Faculty Advisers

Each entering student is assigned to a faculty adviser at the time of registration and must report to his adviser. A student must consult with his adviser in order to determine his course and cannot complete his registration without the signature of his adviser. It is understood that all students will continue to consult their advisers at the time of registration throughout the period of their academic work.

Requirements for Degree of Bachelor of Divinity

Course requirements are of three kinds: Those of the core curriculum, professional courses, and practicums related to field work. Courses of the core curriculum are required of all students; the professional courses required vary with the prescription of the six Vocational Groups. Practicums are required of students engaged in regular or summer field work.

Requirements for the Junior Year

Courses of the Core Curriculum

	<i>s.h.</i>
O.T. 11. Introduction to the Old Testament I	3
C.H. 13. History of the Church to the Protestant Reformation	3
C.H. 14. History of Modern European Christianity	3
N.T. 18. Early Christian Life and Literature	3
T.S. 20. Types of Religious Philosophy*	3
H.T. 21. Theology of the Protestant Reformation	3

Professional Courses

P.S. 10. I. The Church and the Minister's Vocation	1
P.C. 26. II. Introduction to Pastoral Care	3

*Advanced standing entitles the student to elect C.C. 16 *Contemporary Western Culture*.

Field Work Practicums

Field Work Practicum I (For Student Pastors)	1
Field Work Practicum II (For Summer Endowment)	1

Requirements for the Middler Year

Courses of the Core Curriculum

O.T. 12. Introduction to the Old Testament II	3
N.T. 19. Introduction to New Testament Theology	3
W.C. 24. Philosophy of the Christian World Mission*	2
C.E. 27. Christian Ethics	3
A.C. 28. History of American Christianity	3
C.T. 32. Introduction to Christian Theology I	3
C.T. 33. Introduction to Christian Theology II	3

Professional Courses

Pr. 29. III Sermon Construction—Theory	2
Pr. 30. V Sermon Construction—Practice	1

Professional Courses III and V required of all students in Vocational Groups I, III, IV, VI, and, on occasion, II and V.

Requirements for the Senior Year

I. Professional Courses

C.Ed. 22. IV Theology and Christian Nurture	3
C.P. 23. VI The Care of the Parish	3
Pr. 31. VIII Preaching (Practice)	1

Professional Course IV required of all students in Vocational Groups, I, II, III, and VI.

Professional Course VI is required of students in Vocational Groups I, II, and IV.

Professional Course VIII is required of students in Vocational Group I.

II. Vocational Groups

Each student, not later than the end of the junior year, shall choose one of the six Vocational Groups listed on pages 25 to 27 and will meet the vocational requirements of the group chosen.

III. Vocational Qualifying Finals

Each senior student shall complete his academic program during his senior year by registering for and fulfilling the requirements of the

*Required of Vocational Groups I, II and III.

qualifying final discipline pertaining to his chosen vocational group.
(Not applicable to Group VI.)

IV. *Free Electives*

The student will choose a sufficient number of courses to make up the total of 90 semester hours required for graduation. Language courses count as free electives.

V. *English Bible*

A knowledge of the content of the English Bible requisite to the discharge of the teaching and preaching task of the Christian ministry is required and will be tested. Such proficiency must be demonstrated by the end of the student's senior year. Successful completion of Old Testament English Bible I and New Testament English Bible II (see pp. 49, 51) fulfill this requirement. A student may, however, sit for the final examinations in these courses and by passing them fulfill the requirement, in which latter case he receives no academic credit.

Suggested Distribution by Semesters of Required Courses

*First (Junior) Year**

Fall Semester

<i>Required in this Semester</i>	<i>s.h.</i>
10. I The Church and Minister's Vocation	1
11. Introduction to the Old Testament I	3
13. History of the Church to the Protestant Reformation	3
18. Early Christian Life and Literature	3
20. Types of Religious Philosophy†	3
Field Work Practicum I (Student Pastors)	1

Spring Semester

<i>Required in this Semester</i>	<i>s.h.</i>
14. Modern European Christianity	3
21. Theology of the Protestant Reformation	3

*15 hours is the normal program, not over 16 hours may be scheduled in either semester.

†Students with Advanced Standing may enroll in C.C. 16, Contemporary Western Culture.

26. II Introduction to Pastoral Care	3
Field Work Practicum II (Summer Field Work)	1

*Second (Middler) Year**

Fall Semester

Required in this Semester *s.h.*

19. Introduction to New Testament Theology	3
24. Philosophy of the Christian World Mission†	2
28. History of American Christianity	3
29. III Sermon Construction—Theory	2
32. Introduction to Christian Theology	3

Spring Semester

Required in this Semester *s.h.*

12. Introduction to the Old Testament II	3
27. Christian Ethics	3
30. V Sermon Construction—Practice	1
33. Introduction to Christian Theology	3

Third (Senior) Year

Fall Semester

Required in this Semester *s.h.*

22. IV Theology and Christian Nurture	3
C.P. 23. VI The Care of the Parish	3
Pr. 31. VIII Preaching (Practice)	1

Schedule of Required Courses

First Year—Fall Semester

Hour	Monday	Tuesday	Wednesday	Thursday	Friday
8:10					
9:10		N. T. 18	N. T. 18	P. S. 10	N. T. 18
10:10		Chapel	Chapel	Chapel	Chapel
11:00		C. H. 13	Assembly	C. H. 13	C. H. 13
12:00	C. C. 16		C. C. 16		C. C. 16
	T. S. 20		T. S. 20		T. S. 20
2:00	O. T. 11	Practicum	O. T. 11		O. T. 11

*Professional Courses I and II required of all students. Professional Course III, required of Vocational Groups 1, 3, 4, 6, and on occasion 2 and 5. Professional Course V, required of all students in Vocational Groups 1, 3, 4, and 6, and on occasion 2 and 5. Professional Course IV, required of all students in Vocational Groups 1, 2, 3, and 6.

†Required of students in Vocational Groups 1, 2, and 3.

First Year—Spring Semester

<i>Hour</i>	<i>Monday</i>	<i>Tuesday</i>	<i>Wednesday</i>	<i>Thursday</i>	<i>Friday</i>
8:10					
9:10		C. H. 14	C. H. 14		C. H. 14
10:10		Chapel	Chapel	Chapel	Chapel
11:00			Assembly		
12:00					
2:00	H. T. 21	*Practicum	H. T. 21		H. T. 21
3:00	II P. C. 26		II P. C. 26		II P. C. 26

Second Year—Fall Semester

<i>Hour</i>	<i>Monday</i>	<i>Tuesday</i>	<i>Wednesday</i>	<i>Thursday</i>	<i>Friday</i>
8:10					
9:10		C. T. 32	C. T. 32		C. T. 32
10:10		Chapel	Chapel	Chapel	Chapel
11:00		A. C. 28	Assembly	A. C. 28	A. C. 28
12:00		III Preach- ing 29		III Preach- ing 29	
2:00	O. T. 12		O. T. 12		O. T. 12

Second Year—Spring Semester

<i>Hour</i>	<i>Monday</i>	<i>Tuesday</i>	<i>Wednesday</i>	<i>Thursday</i>	<i>Friday</i>
8:10					
9:10		C. T. 33	C. T. 33	V Preach- ing 30	C. T. 33
10:10		Chapel	Chapel	Chapel	Chapel
11:00		C. E. 27	Assembly	C. E. 27	C. E. 27
12:00					
2:00	N. T. 19	W. C. 24	N. T. 19	W. C. 24	N. T. 19

Third Year—Fall Semester

<i>Hour</i>	<i>Monday</i>	<i>Tuesday</i>	<i>Wednesday</i>	<i>Thursday</i>	<i>Friday</i>
8:10					
9:10					
10:10		Chapel	Chapel	Chapel	Chapel
11:00		IV C. Ed. 22	Assembly	IV C. Ed. 22	IV C. Ed. 22
12:00		VI C. P. 23	VIII Pr. 31†	VI C. P. 23	VI C. P. 23
2:00					

*For Duke Endowment Students, additional sections of Practicum are available.
Professional Courses I and II required of all students.

†Sections to be arranged.

Vocational Groups

In recognition of the existing and growing diversity of function within the 20th century Protestant Christian ministry, the program of studies leading to the B.D. degree has been designed to afford variability of emphasis within a basic unity. The core curriculum of basic theological studies provides uniform requirements for all. Variability of emphasis derives from the carefully tailored requirements peculiar to each vocational group. Election of a vocational group is election of a cluster of required courses regarded as providing adequate conversancy with a range of subject matter most pertinent to the special emphasis of the vocational group.

Each student shall choose his vocational group during the second semester of his first or junior year and give notice of his choice to the Office of the Dean of Students not later than May 1.

The student is urged to consult his faculty adviser in making his selection of a vocational group. Students electing Vocational Group I will be certified for that group by the Dean of Students. Students electing Vocational Group II shall have the approval of Professor Kale; those electing Vocational Group III, the approval of Professor Lacy; and those electing Vocational Group IV, the approval of Professor Goodling. Students electing Vocational Group V shall have the approval of the Dean and must offer an average of "B minus" for the academic record of their junior year. Students electing Vocational Group VI must have the approval of the Dean of Students. Choice of a vocational group is regularly subject to review of the Dean, and to the right to require alteration of election is reserved.

A qualifying final discipline is attached to each vocational group and constitutes a requirement for graduation. Open to students in their senior year, it carries two semester hours of credit. See page 27.

Electives in sufficient amount to complete 90 hours for graduation will be taken.

I. The Parish Ministry

A student electing Vocational Group I shall plan his program to include one course at a level higher than the core requirement from six of the following areas:

Biblical Studies
Care of the Parish
Christian Education
Historical Studies

Pastoral Care
Church at Worship
Theological Studies

This Vocational Group requires the following Professional Courses: III, IV, V, VI, VIII, and Philosophy of Christian World Mission.

II. The Ministry of Christian Education

A student should plan his courses so as to include three of the following Christian Education courses: 125, 126, 161, 162, and 169 and at least one course from among the following: 164, 165, and 166.

In addition the student is required to take P.C. 170 and the following Professional Courses: IV, VI, and Philosophy of Christian World Mission. Each student who selects this group will be guided in distributing the electives among the four major divisions of the curriculum.

Those students planning to pursue the Ministry of Christian Education within the Parish Ministry may also in certain circumstances be advised to take Professional Courses III and V.

This Vocational Group requires the following Professional Courses: IV, VI, VII, and Philosophy of Christian World Mission.

III. The Ministry of Missions

The student should plan his course so as to include the following courses in Missions and related subjects: W.C. 24, 133, and 156; H.R. 158; and C.E. 190. In addition he should take at least one of the following courses, depending on his field of anticipated service: H.R. 179, 180, and 182 or C.T. 213 (with appropriate substitutions if these are not offered).

Professional Courses III, IV, and V are required of this group.

IV. The Ministry of Pastoral Care

In addition to the required course in Pastoral Care, P.C. 26, the student should plan his program so as to include the following: P.C. 170; 171 or 172; 177; 174 or 188; C.T. 125 or T.S. 102; and H.T. 121 or one advanced course in Church History. Students must also take one advanced course in each of the following areas: Christian Theology; Christian Ethics or Christianity and Culture; and Biblical Studies.

Professional Courses III, V, and VI* are required of this group.

V. The Ministry of Teaching

A student electing Vocational Group V shall declare his major during the second semester of his first or junior year and shall select for concentration five of the areas listed below of which one shall be the designated major in which he shall take not less than nine semester hours. He shall in addition, ordinarily, take not less than five semester hours in each of the other four areas. Normally, the above requirements are met by courses of advanced level; however, introductory courses of the core curriculum, not already taken as standard requirements of the junior and

*C.Ed. 161 or 162 may be substituted for Professional Course VI.

middler years may be included as fulfilling the major and minor areas of study.

American Christianity	History of Religions and
Christian Education	World Christianity
Christian Ethics	New Testament
Christianity and Culture	Old Testament
Church History	Theology and Philosophy of Religion
Historical Theology	
Professional Courses III and V (or IV).	

VI. The Ministry to the Campus

Students electing this group are required to take at least one advanced course in Christianity and Culture, and one advanced course in Pastoral Care. They are also required to take C.Ed. 149. In addition, they are advised to select electives in consultation with the director of Vocational Group VI in such fashion to maintain balance between the several disciplines.

Students of this group are required to serve an apprenticeship which may be accomplished in either of two ways:

1. A student may work part-time for one academic year as commuting active staff member of a denominational college chaplaincy program currently operating on one of the campuses within a fifty-mile radius of Duke University. Specific assignments and terms of employment as permitted by the academic load of the students would, in such cases, be arrived at in consultation with the director of Vocational Group VI.

2. A student may apply to an appropriate foundation (or other comparable agency) for grant to work full time for a year as a Seminary intern in a college campus situation and, if he is awarded such a grant, fulfill in this way the apprenticeship requirement. Students of Group VI are encouraged to apply for such a grant before proceeding otherwise.

A student's association as intern or member of a chaplain's staff will be recorded on his transcript. Regular reports of the student's activity and performance are to be made by the student and by his immediate supervisor during the term of his work as intern or staff member.

Professional Courses III, IV, and V are required of this group.

Senior Vocational Qualifying Finals

Students of Groups I and V normally fulfill the above requirements during their fifth or sixth semester of residence. Students of Groups II and III normally receive assignments early in the fifth semester of resi-

dence and complete the assignment before graduation, although the date by which assignments must be completed may be set at the discretion of the student's committee. Students of Group IV normally take their seminar in the sixth semester of residence. The qualifying discipline for each group carries, when successfully completed, two semester hours of credit.

Each student must, as a requirement for graduation, complete the qualifying discipline of his chosen Vocational Group as described in the following paragraphs.

For Vocational Group I. On the basis of materials designated by instructors and developed according to methods and standards described in exemplary lectures given by a faculty panel, a student of this group is to write the following: (a) a complete, critical exegesis of an assigned Biblical text, (b) an analysis of a given theological theme related to the passage, showing both the Christian consensus and the student's assessment of it, and (c) a discussion of the problems involved in the homiletical presentation of the theme as uncovered by (a) and (b).

For Vocational Groups II and III. A student of either of these groups presents to a specified committee of the faculty an essay on an assigned subject. For credit the essay must, in the opinion of the committee, demonstrate the relation of the student's choice of particular field to his total program of study.

For Vocational Group IV. Each student electing this group must complete the seminar in the Theology of Pastoral Care, staffed by an interdisciplinary committee of the faculty, and present to the committee a paper on an assigned subject during the course of the seminar.

For Vocational Group V. A student electing this Group must satisfy the following Senior Vocational Qualifying Final requirements.

Not later than the beginning of his final semester the student shall select a subject for research in consultation with a designated professor in the area chosen by the student as his major.

During the semester he shall compile an annotated bibliography for the study of this subject, generally guided by the selection and evaluation of works, both primary and secondary, which he would normally use in planning a syllabus and bibliography for teaching a course with this subject as principal focus, and specifically informed by limits and criteria agreed upon by student and professor.

Not later than the second week before final examinations, the student should present three copies of this bibliography to the professor who shall, in agreement with the director of the qualifying final for the year (or his representative) and one other member of the faculty invited by the director, meet with the student for an oral discussion and examination of the bibliography. This examination should last not less than one hour and not longer than two.

The grade for the student should be determined by the professor of the student's major area, taking due account of the estimate of the bibliography offered by the other faculty members of the committee.

For Vocational Group VI. Students of this group are not required to take a qualifying final.

Administering the Curriculum

For the administration of the curriculum the following regulations have been adopted.

1. Full-time students must take the required courses as specified for the respective semesters.

2. The schedules of all students are subject to review and approval of the Dean and the Committee on Academic Standing.

3. Students in candidacy for the B.D. degree who accept student pastorates are advised that their program of study will require a fourth year. Students with pastoral charges will enroll for not less than eight nor more than twelve semester hours in any given semester.

4. Ordinarily, a student enrolled in candidacy for the B.D. or M.R.E shall enroll for no less than eight semester hours in any semester.

5. Not over 30 semester hours of Summer Session work may be credited toward the degree of Bachelor of Divinity.

6. The status of special student may not be granted simply to permit avoidance of the schedule of required courses. Every request for this classification will be carefully investigated and approval of the Dean is required.

7. A fee of \$15.00 is charged for auditing any course except where a student is already paying regular University fees. Permission to audit requires the approval of the Dean and the instructor concerned.

8. Student pastors and students working under The Duke Endowment Summer Field Work Program of the Rural Church are required to take one of the Field Work Practicums.

Language Study

A student who takes six hours of a New Testament language may be excused from either N.T. 18 or N.T. 19; one who takes six hours of an Old Testament language may be excused from either O.T. 11 or O.T. 12, depending on the year in which he takes Hebrew.

A part-time student who desires to begin the study of Greek in the first year may postpone the required course in Old or New Testament.

For a student planning to take both Greek and Hebrew, the Greek may be continued in the second year by postponing N.T. 19 in the fall semester and waiving O.T. 12 in the spring semester. (Reversed 1966-67.)

Suitable entry will be made on the permanent record of any student who is granted permission to deviate from the requirements in the matter of language.

Graduation Credits

It is the responsibility of each student to see that he meets all requirements for graduation, and to take his courses in proper sequence. He is also responsible for seeing that any special permission granted him to deviate from the normal program is properly recorded in his personal files. Deviations from a normal academic program must be approved by the Dean of Students as representative of the Dean of the Divinity School.

Grading System

The grading system of the Divinity School employs the letters A, B, C, D, and F, which have been defined as follows: A, Excellent; B, Superior; C, Average; D, Inferior; F, Failure; WP, Withdrew Passing; WF, Withdrew Failing; WI, Withdrew Illness and I, Incomplete; P, Passed. (See section on Incompletes.) No percentage equivalents are stated. A student is expected to maintain an average of "C."

In all courses where the instructor considers attendance a necessary part of the work of the course, a student may not receive a grade of over "C" if his absences total 12 per cent of the regular class periods, and if the absences total 24 per cent of the class periods he may not receive credit for the course.

Incompletes

A student may, with the permission of the instructor concerned, petition the Dean of Students to receive a grade of "incomplete" in a course. Such permission may be granted when a student, through some circumstance beyond his control, such as illness, has been hindered from meeting the course requirements. No "incomplete" is recorded without permission in writing from the Dean of Students. Ordinarily, an "incomplete" will not be approved in the case of students completing their academic work in the fall semester. An "Incomplete" automatically becomes an "F" unless it is removed through completion of assigned work by the following dates:

- for "Incompletes" incurred in fall semester courses, March 15, following;
- for "Incompletes" incurred in spring semester courses, October 15, following; and
- for "Incompletes" incurred in summer courses, October 15, following.

Change of Course or Withdrawal

A student is permitted to change his registration for course work without incurring a penalty no later than completion of the second meeting of the course from which he desires to withdraw or, correspondingly, of the course to which he seeks admission.

No student shall be permitted to drop a course after the expiration of one-third of the period of instruction of the course without incurring failure, except for causes adjudged by the Dean of Students to be beyond the student's control. Conditions of emergency and not considerations of convenience shall be regarded as determinative in considering requests.

Graduation with Distinction

Students who achieve a grade point average of 3.75 (A, 4; B, 3; C, 2; and D, 1) for over-all academic record in the Divinity School are granted the degree of Bachelor of Divinity, *summa cum laude*. Students with a grade point average of 3.5 are awarded the degree, *magna cum laude*. Such distinction is specified on their diplomas.

The Master of Religious Education Degree

The course of study leading to this degree is designed for persons desiring to engage in various forms of Christian Education.

Candidates for this degree must hold the degree of A.B. (or its equivalent), based upon four years of work beyond secondary education, in a college which is approved by one of the regional accrediting bodies, and with academic and personal records which afford promise of competence in this area of service. The course of study will be especially useful for individuals who have had one or more years of experience in Christian Education and desire further training. Candidates for this degree will be limited in number, and individuals interested are urged to apply for admission well in advance of the opening of the academic year. All work offered for this degree, whether in the regular year or in summer sessions, must be completed within a period of six years from the date of beginning.

It is desirable that an applicant for admission show a college average of not less than B-, but other factors are also important, and the Committee on Admissions takes special note of a rising curve of academic achievement and the supporting letters from college instructors and administrators as well as church officials.

Prerequisites

Three of the following five prerequisite studies must have been taken by the candidate prior to his admission to the Divinity School or must be

secured, without credit toward the M.R.E. degree, after being admitted:

General Psychology	3 s.h.	Education	3 s.h.	Religion	3 s.h.
Sociology	3 s.h.	Philosophy	3 s.h.		

General Requirements

Sixty semester hours of graduate-professional work are required for graduation. Not more than twelve semester hours of this work may be taken in approved summer sessions.

No credits are allowed for undergraduate courses. However, in approving plans of study leading to this degree, consideration will be given to earlier work taken in the fields of Biblical studies and Christian Education provided such courses were taken in the junior and senior years in accredited four-year colleges. Also, where candidates for the degree have been engaged professionally as Directors or Ministers of Christian Education for not less than twelve months prior to entering the Divinity School, a research project may be substituted for the required Christian Education Practicum, with the approval of the Director of the M.R.E. program and the Dean.

A student who secures credit for 15 semester hours each semester will be in line for graduation at the end of two academic years. The amount of work allowed in each semester may not exceed that permitted in the B.D. curriculum.

Candidates must also pass the English Bible examinations or equivalent described under requirements for the B.D. degree. Normally these examinations are taken in the second year of the M.R.E. program but, with permission of the director of the M.R.E. program, may be taken during the student's first year of residence.

Course Requirements for the M.R.E. Degree

<i>Subject</i>	<i>Required Semester Hours</i>
Biblical Studies (O.T. and N.T.)	9 to 12
Church History, Historical Theology and American Christianity	9 in two or more of these fields
Christian Theology	3 to 6
Philosophy of Religion or Christian Ethics	3
Worship	3
Pastoral Care	3
Christian Education	11
(including missionary education)	
Christian Education Practicum	3
Required Hours	44 to 50
Electives	10 to 16
Total hours, required and elective:	60

The Master of Theology Degree

The course of study leading to the degree of Master of Theology is designed for graduates of accredited theological schools who desire to continue or resume their theological education for enhancement of professional competence in selected areas of study. Enrollment in the Th.M. degree program is open to a limited number of students who have received the B.D. (or the equivalent) with superior academic records.

General Requirements

The general requirements for the degree of Master of Theology are:

1. thirty semester hours of advanced studies, with a minimum grade of "B" in each course;
2. superior performance in a comprehensive examination covering the major and minor areas of study; and
3. residence for one academic year.

There are no general language requirements, but classical or modern languages may be required for certain courses (for example, Hebrew or Greek in Biblical studies).

The Program of Study

At least twelve of the required thirty hours must be taken in one of the basic divisions of study (Biblical, Historical, Theological, or Professional) which shall be designated as the candidate's major, and at least six hours in another of the divisions which shall be designated as the candidate's minor. No more than twelve hours may be taken in the summer sessions. No more than six semester hours of work completed in another accredited institution may be transferred and credited toward the degree. Ordinarily, no more than six hours may be taken through directed reading, and no more than three in any one semester or summer term. In the area of Pastoral Care, up to fourteen hours may be taken through clinical training.

The major in Pastoral Care requires a calendar year. The candidate normally begins his training in June. This program provides two quarters of clinical credit through the Institute of Pastoral Care.

Each student will plan his program of courses and directed reading or clinical training with the guidance of a committee of two to be appointed by the director of the Master's Program. The committee will include a professor in the student's major area of interest, who will act as chairman, and a professor in the minor area. The chairman, in consultation with the director and the other member of the committee, will prepare, administer, and evaluate the comprehensive examination.

The comprehensive examination will be given at the close of the course of study for the degree, ordinarily in May or September.

The entire program of studies and comprehensive examination should be completed within twelve months. In exceptional cases, the time limit may be extended, but in no case beyond three years.

Please note under the chapter on "Student Expenses and Residential Arrangements" that the charges for tuition and general fee, combined, are made on the basis of the number of semester hours taken, and that in order to be eligible for medical and surgical care a student must be taking at least seven hours.

Student Expenses and Residential Arrangements

Fees and Expenses

Tuition and General Fees

There is an admission fee of \$30.00 which is applied to the first term bill. (See statement of requirements for admission for full details.)

<i>Items</i>	<i>Per Semester</i>
Tuition—B.D. and M.R.E.	\$262.50
General Fee—B.D. and M.R.E.	56.50
Approximate cost of meals	275.00
Room (double) for men	155.00
	\$749.00

The General Fee is in lieu of all special charges, and includes the following fees: matriculation, medical (provided student is taking at least 7 hours), library, damage, commencement, and diploma.

A student who is a candidate for either the B.D. or M.R.E. degree shall be liable for the tuition and general fee for the number of semesters required to complete the degree under a normal load of 15 hours. The B.D. candidate will pay tuition for six (6) semesters and the M.R.E.

candidate for four (4) semesters. If extra semesters are required to complete the degree, there will be no tuition for the extra semesters; however, the General Fee will be payable on a prorated basis.

Master of Theology Candidate. A student who is a candidate for the Th.M. degree shall be liable for tuition and general fee, combined, at the rate of \$20.00 per semester hour. All other costs and regulations for the Th.M. degree are the same as those for the B.D. and M.R.E. degrees.

Both the tuition and the general fee are due and payable not later than the day of registration for a particular semester.

Other Fees

Special Students. Those who are enrolled but who are not candidates for a degree. Tuition and general fee will be on a prorated basis and no scholarship aid is available.

Students matriculating in either semester at a date later than that prescribed in the catalogue shall pay to the Bursar of the University a penalty of \$5.00. After the day of registration no refund of the general fee or tuition will be made except for involuntary withdrawal to enter the Armed Services.

Athletic Fee. Divinity School students may secure admission to all regularly scheduled University athletic contests held on the University grounds during the entire academic year by payment of the athletic fee of \$15.00 per year, plus any Federal tax that may be imposed. This fee is payable in the fall semester.

Auditing Fees. Persons seeking to audit Divinity School courses must, with the consent of the instructor concerned, secure permission of the Dean's office. In accordance with general University practice a fee of \$15.00 per course will be required of all auditors who are not enrolled students.

Estimated Expenses

The total cost for a student to attend the Duke Divinity School varies according to individual tastes and requirements; however, experience indicates that a single student may expect to spend from \$1800 up, with the average approximately \$2050, and a married couple may expect to spend from \$3000 up.

The Board of Trustees of Duke University determines the costs of attending the Divinity School, and these are subject to change without notice.

Debts. Students who are reported by the Treasurer's Office as delinquent in their accounts will be debarred from credit in courses until cleared by the Treasurer's Office. Transcripts will not be issued for delinquent students.

Student Health

The payment of the general fee entitles the student who is taking a minimum of seven hours to full medical and surgical care, with the exceptions noted below. This service is under the direction of the University Physician with the cooperation of the staff of Duke Hospital. It includes hospitalization, medical and surgical care, drugs, dressings, X-ray studies, and ward nursing. A charge for board is made at the same rate as in the University dining halls. Refraction of eyes, treatment of teeth, and of all chronic conditions, such as the removal of diseased tonsils, are not included in this service. The cost of any necessary braces and orthopedic appliances, as well as of special nursing, must be borne by the student.

Since the Student Health Program does not cover students while away from the Duke Campus, it is imperative that student pastors and assistant pastors (winter and/or summer) who are subjected to the hazards of highway travel with great frequency, secure complementary health and accident insurance for the full twelve month period.

Information concerning such a policy may be secured by inquiring at the office of the Dean of Students. Such a complementary policy is recommended for all students.

Married students are required to carry insurance coverage for their dependents, providing for hospital, medical, and surgical care.

Living Accommodations

Housing

The Men's Graduate Center is available to men enrolled in the Divinity School. The rooms are equipped for two persons and the rental charge for a double room is \$155.00 each semester per occupant. The rental charge for a single room is higher.

A graduate section in Hanes Annex near the Men's Graduate Center is available for women students in the Divinity School who desire to reside in University residence halls. The rental charge is \$167.50 per semester for each occupant. Sixty-six spaces are available in twenty-two family type air conditioned apartments, featuring one large bedroom, one smaller bedroom, one and one-half baths, a kitchen-dining room, and a living room. The rental rate for each occupant is \$225.00 per semester. Details of housing for graduate women will be provided on request to the Director of Housing, Duke University, Duke Station, Durham, North Carolina.

Duke University Apartments, which consist of efficiency, one- and two-

bedroom apartments, are available to married graduate students. The apartments are complete with basic furnishings and the current rental charges per month are \$70.00 for the efficiency, \$90.00 for the one-bedroom, and \$110.00 for the two-bedroom. Heat, electricity, except for window fans and air conditioners, hot and cold water, garbage and trash collection, and maintenance of grounds are all included in the rental charge. For further information on married student apartments, write to the Director of Housing, Duke Station, Durham, North Carolina.

Residence hall rooms, graduate women's apartments, and Duke University Apartments may be reserved by new applicants only if they have been accepted officially for admission to the Divinity School. Applications for residence hall rooms are to be made to the Director of Housing, Duke Station, Durham, North Carolina. A \$25.00 room deposit is required of each applicant before a residence hall room or women's apartment reservation is made. The initial room deposit is effective during the student's residence in the University residence halls or graduate women's apartment if attendance is continuous in regular academic years. The deposit will be refunded under the following conditions:

1. Within thirty days after the student has been graduated provided written notice is received at the Housing Bureau requesting refund.
2. Upon withdrawal from Duke University Residence Halls by students enrolled on the semester basis, provided written notice is received in the Housing Bureau by August 1st for cancellation of a reservation for the fall semester, and not later than January 15th for cancellation of a reservation for the spring semester.
3. When the reasons requiring withdrawal are beyond the student's control.

No refund will be made until the occupant has checked out of his room through the Housing Bureau and has settled his account with the Bursar.

A resident student, in order to retain his room for the succeeding academic year, must make application at the office of the Director of Housing for confirmation of the reservation.

The authorities of the University do not assume responsibility for persons selected as roommates. Each student is urged to select his roommate when the room is reserved. Any student who occupies a double room without a roommate will be given written notice from the Housing Bureau to obtain a roommate or he may be required to pay the rental consideration for the whole room. Apartment regulations are similar.

Any exchange of rooms must be made at the Housing Bureau. Persons exchanging rooms without the approval of the Housing Bureau will be subject to the charges for both rooms.

Rooms and apartments for graduate women are rented for the academic year but for no period of less than one semester without special arrange-

ments. After the day of registration, no refund of room rent will be made except for involuntary withdrawal to enter the Armed Services. Such refunds will be made in accordance with the University's established schedule. Regulations governing the occupancy of rooms will be supplied by the Housing Bureau to those students who make application for housing. Occupants are expected to abide by these regulations.

Dining Halls

Food service on both the Woman's College Campus and the West Campus is cafeteria style. The cost of meals approximates \$250.00-\$300.00 per semester depending upon the need and taste of the individual. The dining facilities on the West Campus include three cafeterias with multiple choice menus and, in addition, the Oak Room, where full meals and *a la carte* items are served. The Men's Graduate Center has a cafeteria open at meal hours and a coffee lounge which is open until 11:00 p.m. The prices are the same as in the West Campus Union.

Motor Vehicles

Each student possessing or maintaining a motor vehicle at Duke University shall register it annually at the Traffic Office in Building 10. It must be registered within five (5) calendar days after operation of vehicle on campus begins. Students resident in dormitories are required to pay an annual parking fee of \$30.00 for each motor vehicle, excepting that a parking fee of \$10.00 is required for each motorcycle, motorbike, or motor scooter. The proper registration emblem must be displayed at all times.

At the time of registration of a motor vehicle, the following documents must be presented:

1. State vehicle registration certificate.
2. Valid driver's license.
3. Satisfactory evidence of automobile liability insurance coverage within limits of at least \$5,000.00 per person and \$10,000.00 per accident for personal injuries, and \$5,000.00 for property damage, as required by North Carolina Motor Vehicle Law.
4. If student is under 21, a statement signed by the student's parent or guardian granting the student permission to operate a motor vehicle at Duke University.

Students are expected to abide by the Parking, Traffic and Safety Regulations, a copy of which will be given the student at time of registration.

Statement of Financial Aid

A student should select his school on the basis of educational opportunity. At the same time financial considerations will be of legitimate and often of pressing concern. Each student should formulate at least a tentative plan for financing his seminary education. Such a plan would not of necessity demand absolute assurance of all necessary educational expense, but should include specific resources for the first year and a knowledge of probable resources for the second and third years.

Tuition grants and other financial aids are available in order that no student may experience such financial difficulty as would prevent his obtaining a Divinity School education.

The Committee on Scholarships and Financial Aid will gladly counsel the student concerning financial needs and resources. Financial assistance may consist of scholarships, loans, tuition grants, grants-in-aid, and employment which may be worked out in various combinations on a year-to-year basis, with reapplication and review each year.

Financial Resources

Personal

These may be savings and earnings, gifts from family and friends, and, if married, earnings of spouse and gifts from parents of spouse. In calculating anticipated income, the student first considers his own resources.

Church

Many local churches and conferences or other governing bodies provide gifts and grants for theological education, from Ministerial Training Funds which provide grants and/or loans to theological students. The student makes application to his own church, Annual Conference, Presbytery, or other governing body.

The Divinity School

Scholarships

Junior Merit Scholarships. These are ordinarily granted upon nomination by undergraduate school.

National Methodist Scholarships. The General Board of Education of The Methodist Church makes available two \$500 scholarships to outstanding students in the first year class.

Middler Academic Scholarships. Two scholarships of \$500 each are made available on the basis of academic excellence and leadership potential.

Senior Honor Scholarships. Each year a limited number of honor scholarships are awarded to rising seniors who have achieved academic excellence and who give unusual promise of service in the pastoral ministry.

Foreign Student Scholarships. In cooperation with the Crusade Scholarship Committee of The Methodist Church and other authorized church agencies students are selected and are admitted to courses of study. Scholarships for such students are provided from the Lewis Clarence Kerner Scholarship Fund and from individual Churches and private philanthropy.

Tuition Grants

These, in varying amounts commensurate with need, are available upon application to the Committee on Scholarship and Financial Aid. Currently enrolled students who are eligible for consideration must apply in February prior to the academic year for which a tuition grant is requested. Entering students may apply when admitted.

Grants-in-Aid

Varying amounts are made available through the Divinity School to students who choose to make participation in the Endowment and Field Education Program an integral part of their seminary training. The Grant-in-Aid Program includes the following:

1. Summer Assistant Pastors.
2. Winter Assistant Pastors.
3. Student Pastors. See full description under section on Field Education.

Loans

Loan funds held in trust by the University, as well as Methodist Student Loans and funds supplied by the Federal Government, through the National Defense Education Act of 1958, are available to qualified students. Submit application by July 1.

Note: Unless otherwise indicated all correspondence concerning financial aid should be directed to: Financial Aid Office, The Divinity School, Box 4814, Duke Station, Durham, N.C.

Employment

Students or wives desiring employment with the University should apply to the Director of Personnel, 01 Allen Building, Duke University, Durham, North Carolina. Students or wives make their own arrangements for employment either in the City of Durham or on campus.

Financial Aid Resources

Certain special funds have been established, the income from which is used to provide financial aid through scholarships and grants-in-aid for students wishing to secure training in preparation for Christian ministry. The resources listed below include endowed funds and sources of annual contributions.

R. Ernest Atkinson Legacy

This legacy was established in 1952 under the will of the Reverend R. Ernest Atkinson of Richmond, Virginia, who was a member of the Trinity College Class of 1917.

Mary Reynolds Babcock Foundation Scholarships

Through the Mary Reynolds Babcock Foundation of Winston-Salem, North Carolina, a limited number of scholarships in an amount not exceeding \$1,400 per year are granted to students in candidacy for the B.D. degree, on nomination and decision of the Dean and Committee on Scholarships and Financial Aid.

E. M. Cole Fund

This fund was established in 1920 by Mr. Eugene M. Cole, a Methodist layman of Charlotte, North Carolina.

The Duke Endowment

Among the beneficiaries of The Duke Endowment, established in 1924, are the rural Methodist churches of the two North Carolina Conferences. Under the Maintenance and Operation Program grants-in-aid are available for Duke Divinity School students to participate as assistant pastors in rural Methodist churches under the Endowment and Field Education Program.

N. Edward Edgerton Fund

This fund was established in 1939 by Mr. N. Edward Edgerton of Raleigh, North Carolina, an alumnus of Duke University of the Class of 1921.

Thomas Jefferson Finch Scholarship

In 1955 Mr. George David Finch, '24, and Mr. Brown Faucette Finch, '54, established an annual scholarship in the amount of \$650 a year in memory of Mr. Thomas Jefferson Finch, Trinity College Class of 1884, who was the father and grandfather of the donors.

The James A. Gray Fund

In 1947 Mr. James A. Gray of Winston-Salem, North Carolina, presented the fund, which bears his name, to the Divinity School for use in expanding and maintaining its educational services in behalf of North Carolina churches and pastors.

P. Huber Hanes Scholarship

Mr. P. Huber Hanes of Winston-Salem, North Carolina, an alumnus of Duke University of the Class of 1900, has established for Duke University an annual scholarship fund, a portion of which is used to provide financial assistance for Divinity School students.

George M. Ivey Scholarship Fund

This fund was established in 1948 by gift of George M. Ivey, of Charlotte, North Carolina, an alumnus of Duke University of the Class of 1920.

Lewis Clarence Kerner Scholarship

This scholarship was established in 1959 by Beatrice Kerner Reavis, of Henderson, North Carolina, in memory of her brother, Lewis Clarence Kerner, and designated for the assistance of native or foreign-born students preparing for service in world Christian missions.

Laurinburg Christian Education Fund

This fund was established December 11, 1948, by gift through the Methodist College Advance Fund.

Myers Park Scholarship Fund

This fund was established in 1948 by members of the Myers Park Methodist Church, Charlotte, North Carolina.

W. R. Odell Scholarship

This fund was established in 1946 by the Forest Hills Methodist Church, Concord, North Carolina.

Jesse M. Ormond Scholarship Fund

In 1948 the North Carolina Conference established a fund in honor of Professor Jesse M. Ormond, who for many years was Director of Field Work and Professor of Practical Theology.

Gilbert T. Rowe Memorial Scholarship Fund

This scholarship fund was established in 1962-4 through the generosity of Divinity School Alumni and friends of the late Gilbert T. Rowe, Professor of Symbolic Theology.

Elbert Russell Scholarship

This scholarship was established in 1942 by the Alumni Association of the Divinity School in honor of Elbert Russell, who served as Dean of the Divinity School and Professor of Biblical Theology.

Hersey E. Spence Scholarship

This scholarship was established in 1947 by the Steele Street Methodist Church of Sanford, North Carolina, in honor of Professor Hersey E. Spence, a former pastor of the congregation.

The Methodist Church

The Methodist Church makes a substantial contribution to the Divinity School by designating a certain percentage of its World Service offerings to the Divinity School.

The North Carolina and the Western North Carolina Conferences direct a certain percentage of their College Sustaining Funds to the Divinity School. The South Carolina Conference is a contributor to the Divinity School operational income.

The General Board of Education makes available annually two National Methodist Scholarships having a cash value of \$500 each. (See page 42.)

Local Methodist churches and individuals make contributions to the financial aid program of the Divinity School, thus making it possible to assign students under the Endowment and Field Education Program to urban and out of state churches.

Dempster Graduate Fellowships

The Methodist Board of Education offers each year the Dempster Graduate Fellowships for graduates of Methodist Theological Schools, who are engaged in programs of study leading to the degree of Doctor of Philosophy in Religion with a view to teaching in Methodist colleges and seminaries. Several Divinity School graduates have held these fellowships.

Foreign Scholarship Fund

Maintained through annual contributions of individuals and churches. Contributions for 1965-66 included: St. Paul's Methodist Church, Goldsboro, North Carolina, Hayes Barton Methodist, Raleigh, North Carolina.

Field Education

Its Nature and Purpose. Field Education is conceived to have a two-fold nature. (1) It is a vital part of the total education of the theological student, testing his motivation and fitness for the vocation of the ministry. (2) It is a symbol of a mutual relationship between the seminary and the local church, and it is an effective way of declaring and implementing the purpose of the seminary to serve the church as well as the student.

More specifically it is the purpose of Field Education to: (1) assist the student in understanding the nature and task of the local church; (2) study some of the practical problems involved in the care of the parish; (3) afford an opportunity for the progressive development of the student's knowledge and ministerial skills through responsible participation in the life of the church; (4) contribute leadership to the churches of the region; and (5) provide, in most instances, grants-in-aid to assist the student in defraying educational expenses.

Opportunities for participation in the Field Education program are made available through the cooperative efforts of The Divinity School, churches, pastors, and district superintendents, or equivalent officials of other denominations. The student must make application for the particular program in which he wishes to participate.

Types of Field Education. (1) Summer Assistant Pastors: Upon request of a church, a student is assigned by the Committee on Endowment and Field Education to serve ten weeks as an assistant. The student is provided board, room, laundry, necessary travel, and a grant-in-aid

of \$800.00. To participate the student must secure credit in Practicum II and participate in the preparatory training sessions under The Duke Endowment Student Association. A majority of the students are assigned to Methodist rural charges in the state of North Carolina. Married students whose wives work must be prepared to go without their wives. A limited number of entering students can be assigned; however, prior consideration is given to rising Middler and Senior students. Students transferring to another seminary are not eligible for assignment the summer prior to transfer. (2) Winter Assistant Pastors: In consultation with the pastor, church leaders, district superintendents and/or other responsible leaders, students are assigned to serve as assistants during the academic year. The time element will vary from six to 15 hours per week and the grant-in-aid will vary accordingly up to \$800.00. If more than 15 hours of service per week is required the student will be required to reduce his academic load. (3) Student Pastors: A student may be appointed by an annual conference or other official agency of a recognized denomination to serve as a student pastor. However, the student must have the approval of the Director of Field Education, as agent of the Dean, before accepting an appointment as a student pastor. All student pastors must secure credit for Practicum I; enroll for not less than eight nor more than twelve hours per semester, thus requiring four academic years to complete the B.D. degree; and, if the charge being served is located beyond 50 to 55 miles from the campus, the students are required to live in Durham or vicinity during the academic week, Monday 2:00 p.m. through Friday 4:00 p.m. Salaries and other forms of support are arranged by church officials in keeping with denominational policies and are reported to The Divinity School. (4) Other Church Related Positions: These consist of teaching church school classes and counseling youth groups, and are expected to require no more than three to six hours per week. These positions may or may not involve grant-in-aid.

Supervision. Through the coordinated efforts of the Divinity School, the local churches, District Superintendents, and pastors there is continuous supervision of all students participating in the Endowment and Field Education Program. Under the general direction of the Director of Field Education, members of the administrative and teaching staff share in administering this program.

Supervision is carried on through: (1) Practicum I, required in the first semester of service as a student pastor, and Practicum II, required of all students planning to participate in the Summer Endowment and Field Education Program; (2) Regular visits by supervisors to charges served by student pastors and assistant pastors, followed by student-supervisor conferences; (3) Seminars (one day) for supervisors; (4) Regular reports from all students and charges to the Endowment and Field Education Office.

Courses of Instruction^{*}

Required courses are numbered from 10 to 70. Elective courses carrying credit in the Divinity School only are numbered from 71 to 199. Courses approved for credit in both the Divinity School and the Graduate School of Arts and Sciences are numbered above 200. Lists of courses to be offered in any semester will be available at the time of each registration.

I. Biblical Studies

Old Testament

Old Testament English Bible I. (Meets two hours weekly.) 1 s.h.
Mr. Efrid

11. *Introduction to the Old Testament I.* The origin, literary forms, and contents of the books of the Old Testament in their geographical and historical setting on the Exile. 3 s.h. *Mr. Tucker*

12. *Introduction to the Old Testament II.* Introduction to and interpretation of Exilic and post-Exilic prophecy, Psalms, wisdom literature, the Chronicler, apocalyptic, and the Apocrypha. 3 s.h. *Mr. Goodman*

^{*}On approval of the Dean, courses offered in the Graduate School of Arts and Sciences other than those approved for credit in the Divinity School may be approved for credit in individual cases, provided no equivalent course is offered in the Divinity School; each case to be decided on its merits.

101. *Post-Exilic Prophecy*. A study of the post-Exilic prophets from Ezekiel to Daniel, with special reference to Messianic prophecy and related theological problems. 2 s.h.

106. *Exegesis of the English Old Testament*. A. A book of the Pentateuch; B. A prophetic book; C. A historical book; D. Selected poetical materials. (O.T. 106 A, O.T. 106 B, O.T. 106 C, and O.T. 106 D are separate courses, offered in different semesters.) Prerequisite: O.T. 11 or the equivalent. 2 s.h. *Staff*

196. *The Bible and Recent Discoveries*. A survey of the contribution of the cultural setting of the Bible as an aid to its understanding. 3 s.h.

201-202. *First Hebrew*. The principles and structure of the Hebrew language with translation of selected Old Testament narratives. One year of Greek prerequisite. 6 s.h. *Mr. Stinespring*

207. *Second Hebrew*. Historical Hebrew grammar with reading and exegesis of Old Testament prose (Pentateuch and historical books in alternate years). First semester. 3 s.h. *Staff*

208. *Second Hebrew*. Historical Hebrew grammar with reading and exegesis of Old Testament poetry (Prophets and the Writings in alternate years). Second semester. 3 s.h. *Staff*

209. *Old Testament Theology*. Studies of the Old Testament in regard to theological themes and content. Prerequisite O.T. 11-12 or equivalent. 3 s.h. *Mr. Tucker*

301. *The Theology of the Dead Sea Scrolls*. A study of the religious ideas of the Scrolls in relation to the theology of the Old and New Testaments. Prerequisite: O.T. 11. 3 s.h.

302. *Studies in the Intertestamental Literature*. Selected documents of the Apocrypha and Pseudepigrapha examined exegetically and theologically in their relation to post-Exilic Judaism. Prerequisite: Permission of the instructor. 3 s.h.

304. *Aramaic*. A study of the Aramaic portions of the Old Testament, and selected passages from the Targums, Midrashes, and Talmuds. 3 s.h. *Mr. Stinespring*

305. *Third Hebrew*. An interpretative study of late Hebrew prose, with readings from Chronicles, Ecclesiastes, and the Mishnah. 3 s.h. *Mr. Stinespring*

306. *Language and Literature of the Dead Sea Scrolls*. A study in interpretation. Prerequisite: a knowledge of Hebrew. 3 s.h.

307. *Syriac*. A study of the script and grammar, with readings from the Syriac New Testament and other early Christian documents. Some knowledge of Hebrew and Aramaic prerequisite. 3 s.h. *Mr. Stinespring*

309. *History of the Ancient Near East*. A specialized study of the civilizations of Egypt, Palestine, Syria, and Mesopotamia in the light of Biblical archaeology. 3 s.h. *Mr. Tucker*

310. *Old Testament Prophecy*. The prophetic movement in Israel with

special emphasis on the theological standpoint of the prophets of the eighth century B.C. Prerequisites: O.T. 11 and O.T. 12. 3 s.h. *Mr. Stinespring or Mr. Tucker*

**History of Art 215. Religious Art of the Ancient Near East.* The development of art, particularly architecture and sculpture, as the material expression of religious ideas in Egypt, Mesopotamia, and in part Syria and Palestine to the Persian conquest. 3 s.h. *Mr. Markman*

**History of Art 216. Religious Art of the Classical World.* The religious art, particularly architecture and sculpture, of Greece and Rome with special emphasis on the monuments in the Near East. 3 s.h. *Mr. Markman*

New Testament

New Testament English Bible II. (Meets two hours weekly.) 1 s.h. *Mr. Efird*

18. *Early Christian Life and Literature.* A basic study of the civilization in which Christianity began; the origin and development of the Christian Church and its literature through the second century. 3 s.h. *Mr. Efird*

19. *Introduction to New Testament Theology.* A constructive analysis and exposition of the positive doctrinal content of the New Testament. Prerequisite: N.T. 18. 3 s.h. *Mr. M. Smith*

103-104. *Hellenistic Greek.* Designed for beginners to enable them to read the Greek New Testament. 6 s.h. (Two sections) *Staff*

105. *Studies in Paul.* An investigation of Paul's apostolate based upon the Acts and the Epistles with attention to Paul's theology as reflected in selected passages. 3 s.h. *Mr. Efird*

107. *The Church in the New Testament.* An exegetical consideration of the important New Testament texts relevant to the development of church order, ministry, sacraments, and/or other important dimensions of the primitive community and its self-consciousness. Prerequisite: N.T. 18. or equivalent. 3 s.h. *Mr. M. Smith*

116. *Exegesis of the English New Testament I.* A. Luke-Acts; B. Galatians and I Corinthians; C. The Pastoral Epistles. (N.T. 116 A, N.T. 116 B, and N.T. 116 C are separate courses, offered in different semesters.) 2 s.h. *Staff*

117. *Exegesis of the English New Testament II.* A. The Gospel and Epistles of John; B. Romans. (N.T. 117 A and N.T. 117 B are separate courses, offered in different semesters.) 2 s.h. *Staff*

118. *The New Testament in Greek.* Readings in the Gospels. 3 s.h. *Staff*

119. *The New Testament in Greek.* Readings in the Epistles. 3 s.h. *Staff*

*Course offered in the Graduate School of Arts and Sciences which is credited toward the degree of Bachelor of Divinity.

225. *Living Issues in New Testament Theology.* Examination of recent major questions of debate in the New Testament field. Prerequisite: N.T. 19. 3 s.h.

226. *Exegesis of the Greek New Testament I.* A. Mark and Matthew; B. Romans; C. Colossians and Ephesians. (N.T. 226 A, N.T. 226 B, and N.T. 226 C are separate courses, offered in different semesters.) Prerequisite: N.T. 103-104. 3 s.h. *Mr. M. Smith*

227. *Exegesis of the Greek New Testament II.* A. Luke-Acts; B. Galatians and I Corinthians; C. The Pastoral Epistles; D. The Apocalypse. (N.T. 227 A, N.T. 227 B, N.T. 227 C, N.T. 227 D are separate courses, offered in different semesters.) Prerequisite: N.T. 103-104. 3 s.h. *Mr. M. Smith*

318. *Textual Criticism of the New Testament.* A study of the scientific recovery of the Greek text on which modern versions are based; manuscript discoveries; principles of textual criticism; practice in collating original manuscripts in the Duke collection. Prerequisite: N.T. 103-104, or the equivalent. 3 s.h. *Mr. Clark*

340-341. *Seminar in the New Testament.* Research and discussion on a selected problem in the Biblical field. 3 s.h. *Mr. M. Smith*

See also Pr. 185 and O.T. 209.

***Greek 257.** The social and cultural history of the Hellenistic world from Alexander to Augustus. 3 s.h. *Mr. Rogers*

***Latin 258.** The social and cultural history of the Graeco-Roman world. 3 s.h. *Mr. Rogers*

II. Historical Studies

Church History

13. *History of the Church to the Protestant Reformation.* A survey through the fifteenth century in terms of spiritual genius, organizational development, great literature, and representative movements. 3 s.h. *Mr. Petry*

14. *History of Modern European Christianity.* A survey of the main currents in Reformation and post-Reformation church history. 3 s.h. *Mr. Hillerbrand*

85. *Seminar in Modern European Christianity.* A seminar devoted to the study of select aspects of Reformation and Post-Reformation Church History. This year the seminar will consider Reformation and Post-Reformation Confessions of faith. Prerequisite: C.H. 13-14. 2 s.h. *Mr. Hillerbrand*

*Course offered in the Graduate School of Arts and Sciences which is credited toward the degree of Bachelor of Divinity.

137. *Religious Leaders in Christian History.* Representative leaders in the early and medieval church studies in relation to contemporary churchmanship. Prerequisite: C.H. 13. 3 s.h. *Mr. Petry*

138. *Great Books in Christian History.* An intensive study of Augustine's *Confessions*, Thomas à Kempis' *Imitation of Christ*, Erasmus's *Complaint of Peace*, Luther's *Christian Liberty*, Calvin's *Instruction in Faith*, and Andrewes' *Private Devotions*. 3 s.h. *Mr. Petry*

139. *Methodism.* A study of Methodist societies in England and the developing church in America as they gave rise to such historic issues as polity, education, division, and reunion. Prerequisite: C.H. 13. 2 s.h. *Mr. Petry*

140. *The Rise of Methodism and the Anglican Background.* The Methodist societies within the Church of England to the death of Wesley. Prerequisite: C.H. 13-14. 3 s.h. *Mr. Baker or Mr. Rogers*

(Students are advised that either C.H. 139 or C.H. 140 will satisfy the Methodist Discipline Requirement No. 344.)

142. *British Methodism after Wesley.* British Methodism in its nineteenth and twentieth century development. Prerequisite: C.H. 14. 3 s.h. *Mr. Baker*

250. *The Reformation of the 16th Century.* An advanced study of the time between 1517 and 1555 with particular reference to the left wing movements of reform. 3 s.h. *Mr. Hillerbrand*

251. *The Age of Counter-Reformation.* An advanced study of the time between 1555 and 1650. 3 s.h. *Mr. Hillerbrand*

252. *Pietism, Deism, Rationalism.* An advanced study of the currents of European Christianity between 1650 and 1800. 3 s.h. *Mr. Hillerbrand*

253. *History of Modern Catholicism.* A survey of the main currents of Post-Tridentine Catholicism. 3 s.h. *Mr. Hillerbrand*

330. *The Church in Europe Since 1800.* Emphasis is placed on the relation of the church to the social, economic, and political life of Modern Europe. Particular attention is given to Papal pronouncements on social issues, the relationship of Eastern to Western institutions, and ecclesiastical historiography as it involves source editions, periodicals, and ecumenical literature. 3 s.h. *Mr. Petry*

331. *The Social Message of the Early and Medieval Church.* A study of the social teachings and contribution of the Christian church prior to the Protestant Reformation. Prerequisite: C.H. 13. 3 s.h. *Mr. Petry*

332. *The Medieval Church.* Outstanding characteristics of the medieval church, emphasizing theory, polity, institutions, sacraments, and worship. Prerequisite: C.H. 13. 3 s.h. *Mr. Petry*

334. *Church Reformers and Christian Unity.* The work of such reformers as Marsilius of Padua, William of Ockham, Jean Gerson, Pierre d'Ailly and Nicholas of Cusa in relation to ecclesiastical schism and the

search for Christian unity through representative councils. Prerequisite: C.H. 13. 3 s.h. *Mr. Petry*

336. *Christian Mysticism in the Middle Ages*. Source studies, in historical perspective, of such late medieval mystics as Bernard of Clairvaux, the Victorines, Ramon Lull, Meister Eckhart, Richard Rolle, Catherine of Siena, and Nicholas of Cusa. Prerequisite: C.H. 13. 3 s.h. *Mr. Petry*

Historical Theology

21. *The Theology of the Protestant Reformation*. The Reformation of the 16th century and its outcome in the 17th and 18th centuries. 3 s.h. *Mr. Grislis*

111. *Literature of the Latin Church*. Readings, in the Latin originals, of diverse kinds of writing produced by the Latin Church in various periods of its history. Prerequisite: Permission of instructor. 3 s.h.

120. *Faith and Heresy in Dialogue*. Studies in the origin and role of the Apostles', the Nicene, and the Chalcedonian Creeds in their contemporary setting. 3 s.h. *Mr. Grislis*

121. *Sacraments in the Christian Church*. Ecumenical studies in devotion and division: Baptism and the Lord's Supper. 3 s.h. *Mr. Grislis*

123. *The Theology of the Early Church*. An introduction to the history of doctrine from the 2nd to the 6th centuries. 3 s.h. *Mr. Grislis*

234. *The Theology of Thomas Aquinas*. A systematic interpretation of the thought of Aquinas, with a major emphasis on his specifically theological formulations, drawing upon the *Summa Theologica* and other relevant sources. 3 s.h. *Mr. Grislis*

240. *The Theology of Richard Hooker*. An exposition of the writings of the Systematic Theologian of Anglicanism in the sixteenth century. 3 s.h. *Mr. Grislis*

260. *Seminar: Life and Thought of the Wesleys*. A seminar on John and Charles Wesley and their colleagues in relation to English culture and religion in the eighteenth century. Permission of instructor. 3 s.h. *Mr. Baker*

261. *The Theology of John Wesley*. A study of the development and structure of Wesley's theology, with special reference to his doctrines of man and salvation. Prerequisite: Permission of instructor. 2 s.h. *Mr. Richey*

337. *The Theology of Martin Luther*. A critical and comparative examination of Luther's thought. 2 s.h. *Mr. Hillerbrand*

338. *The Theology of John Calvin*. An exposition of the *Institutes of the Christian Religion* in relation to cognate documents. Prerequisite: H.T. 21. 3 s.h. *Mr. Grislis*

American Christianity

28. History of American Christianity. A consideration of the nature of Christianity in America and the history of its development. 3 s.h. *Mr. Henry*

129. The Theology of American Methodism. A study of Methodist dogmatics from 1784 through 1903, including doctrinal standards and representative systems from Richard Watson through Henry C. Sheldon. 3 s.h. *Mr. Rogers*

199. The American Social Gospel. A study of Protestant social thought and action in America since 1865. 3 s.h. *Mr. Henry*

296. Religion on the American Frontier. A study of the spread of evangelical Christianity as a theological and cultural phenomenon of the American West. Prerequisite: A.C. 28. 3 s.h. *Mr. Henry*

372. Theology of Paul Tillich. An examination of Tillich's philosophical theology. 2 s.h. *Mr. Robinson*

385. Religion in American Literature. A critical study of the meaning and value of religious motifs reflected in American literature. 3 s.h. *Mr. Henry*

395. Christian Thought in Colonial America. Exposition of the main currents in Protestant Theology. 3 s.h. *Mr. Henry*

396. Liberal Traditions in American Theology. A study of the main types of modern religious thought, beginning with the theology of the Enlightenment. 3 s.h. *Mr. Henry*

397. Contemporary American Theology. A critical appraisal of major tendencies. 3 s.h. *Mr. Henry*

World Christianity

24. Philosophy of the Christian World Mission. A study of theological foundations, guiding principles, and contemporary problems of the World Christian Community. 2 s.h. *Mr. Lacy*

133. History of Christian Missions. A survey of the spread of Christianity with special emphasis on 19th and 20th century Protestantism. 2 s.h. *Mr. Lacy*

135. Area Studies of the Christian Church. The cultural setting and current programs and policies of the Church in one of the following areas: a. Latin America, b. India and Pakistan, c. Africa, d. Southeast Asia, e. Japan-Korea-Philippines, f. Moslem Lands, or g. United States Home Missions. (The area of study to be determined by student interest in consultation with the instructor.) 2 s.h. *Mr. Lacy and Others*

156. The Ecumenical Movement. Its contemporary development, structures, activities—and problems, against the background of Church unity and disunity. 3 s.h. *Mr. Lacy*

386. Seminar: Theological Trends in the World Church. Contemporary

currents of Christian thought as they affect the resurgent non-Christian faiths, new formulations of a theology of mission, and ecumenical conversations. 3 s.h. *Mr. Lacy*

See also: C.Ed. 126, C.E. 190, C.E. 292, and C.E. 333.

History of Religions

158. *Contemporary Non-Christian Religions.* Critical consideration of contemporary conditions in major non-Christian traditions, with special reference to Hinduism, Buddhism, Islam, and African Religions. 3 s.h. *Mr. Sullivan*

180. *Religions of the Near East.* Historical and theological introduction to the major indigenous traditions of the Near East, especially Zoroastrianism, and Islam. 3 s.h. *Mr. Partin*

182. *Religions of India.* Historical and theological introduction to Indian religious life and thought. The development of Buddhism is covered, as well as Jainism and Sikhism, along with the various modes of Hinduism. 3 s.h. *Mr. Sullivan*

280. *The History of Religions.* A study of the methodology of the History of Religions, the nature of religious experience and specific categories of religious phenomena. Permission of instructor. 3 s.h. *Mr. Sullivan*

III. Theological Studies

Philosophy of Religion

20. *Types of Religious Philosophy.* Basic historical orientation in religious thought, especially in Western Culture. 3 s.h. *Mr. Robinson*

102. *Christian Apologetics and Modern World Views.* A constructive approach to the Hebrew-Christian understanding of Creator and creature in the light of contemporary scientific knowledge. 3 s.h. *Mr. Robinson*

Christian Theology

32. *Introduction to Christian Theology I.* The major themes of the theology of the church: nature and task of theology, knowledge of God, man and Christ. 3 s.h. *Mr. Cushman*

33. *Introduction to Christian Theology II.* God the redeemer, the church, word and sacrament, authority and ministry, the Kingdom of God. 3 s.h. *Mr. Herzog*

108. *Revelation and Authority.* A study of the relationship between revelation, Bible, preaching and the church. 3 s.h. *Mr. Herzog*

110. *This Life and the Age to Come.* Christian eschatology and the meaning of history in the light of God's triumph over sin, suffering, and death. 3 s.h. *Mr. Robinson*

125. *Theological and Psychological Interpretations of Man. An inquiry into the relations of theological and psychological views of man's nature, predicament, and deliverance. 3 s.h. *Mr. Richey*

195. *Origins of Dogmatic Thought.* An analysis of dogmatic concepts in the Gospel of John: their development into a body of doctrine. 3 s.h. *Mr. Herzog*

200. *The Person and Work of Christ.* The problem of knowledge of Christ and formulation of a doctrine of his work and person in the light of Biblical eschatology. Prerequisite: C.T. 32-33. 3 s.h. *Mr. Cushman or Mr. Hall*

213. *The Structure of Roman Catholic Thought.* The main characteristics of Roman Catholic theology with consideration of possibilities and limitations in ecumenical conversation with Rome. Prerequisites: C.H. 13 and 14 and H.T. 21. 3 s.h. *Mr. Herzog*

216. *Kierkegaard Studies.* Critical examination of selected works. Prerequisite: C.T. 32 or permission of the instructor. 3 s.h. *Mr. Robinson*

224. *Conceptions of Man in Western Thought.* An analysis and interpretation of important types of philosophical and theological theory. 3 s.h. *Mr. Richey*

300. *Systematic Theology.* Method and structure of systematic theology, the doctrine of God, theological anthropology and Christology. Prerequisite: C.T. 32-33 or equivalent. 3 s.h. *Mr. Herzog*

303. *The New Hermeneutic and the Concept of History.* A critical examination of key issues in present-day European systematic theology centered in the positions of Fuchs, Ebeling, Moltmann, Ott, and Pannenberg. Prerequisite: C.T. 32-33. 3 s.h. *Mr. Herzog*

320. *Seminar: Friedrich Schleiermacher.* Critical examination of the dogmatic system. Prerequisite: C.T. 322. 3 s.h. *Mr. Herzog*

322. *Nineteenth Century European Theology.* Protestant theology from Kant to Herrmann. 3 s.h. *Mr. Herzog*

323. *Seminar: Bultmann.* Critical examination of representative works, with some consideration of relation to the work of Martin Heidegger. Prerequisite: C.T. 32-33 or permission of the instructor. 3 s.h. *Mr. Robinson*

325. *Philosophical Theology I.* Main problems in the history of philosophical theology from the pre-Socratics to Descartes. Prerequisite: C.T. 32-33. 3 s.h. *Mr. Robinson*

326. *Philosophical Theology II.* Main problems of philosophical theology in the modern period. Prerequisite: C.T. 325. 3 s.h. *Mr. Robinson*

328. *Twentieth Century European Theology.* Critical examination of

*May be taken and grade recorded as Christian Educ. 125.

the thought of selected Protestant theologians from 1900 to 1950. Prerequisite: C.T. 32-33 and permission of the instructor. 3 s.h. *Mr. Herzog*

Christianity and Culture

16. *Contemporary Western Culture.* An analysis of the conceptual commitments in contemporary styles of thought and life as reflected in the natural sciences, philosophy, social analysis, and the arts. 3 s.h. *Mr. Poteat*

80. *The Christian Faith and Tragedy.* An exploration of the tragic view of life as exhibited in selected classic and contemporary works of literature and a comparison of this with Christian belief. 3 s.h. *Mr. Poteat*

81. *Recent and Contemporary Art and Theology.* The study of 19th and 20th century painting and sculpture as documents of contemporary man's apprehension of himself and his world; and as elements in the conversation between Christian faith and culture. 3 s.h. *Mr. Poteat*

230. *The Meaning of Religious Language.* An analysis of the credentials of some typical claims of theism in the light of theories of meaning in recent thought. Prerequisite: C.T. 32-33 or permission of instructor. 3 s.h. *Mr. Poteat*

231. *Seminar in Christianity and Contemporary Thought.* Analytical reading and discussion of such critical cultural analysis as is found in the works of M. Polanyi, Arendt, Trilling, and others, with appraisal of the relevance for theological inquiry. Prerequisite: C.T. 32-33 or permission of instructor. 3 s.h. *Mr. Poteat*

380. *Existentialist Thought.* An analysis of writings of representative thinkers from Kierkegaard to Sartre. Prerequisite: C.T. 32-33, or permission of instructor. 3 s.h. *Mr. Poteat*

Christian Ethics

27. *Christian Ethics.* The central assumptions and principles of the Christian conception of the good life. 3 s.h. *Mr. Beach and Mr. H. Smith*

114. *Christian Social Ethics.* The principles of Christian social policy with reference to domestic, social, political, and economic patterns of contemporary culture. 3 s.h. *Mr. H. Smith*

115. *Christian Social Action in the Local Church.* Christian ethical principles, resources, procedures, and programs for pastoral leadership in parish social action. 2 s.h. *Mr. H. Smith*

122. *Moral Theology in the Nineteenth Century.* Critical and comparative examination of ethical theory as exhibited in the work of representative theologians. 3 s.h. *Mr. H. Smith*

124. *Moral Theology in the Twentieth Century.* Critical and comparative examination of ethical theory as exhibited in the work of William

- Temple and selected contemporary theologians. 3 s.h. Mr. H. Smith
190. *The Christian Critique of Communism*. Analysis of and alternatives to the dynamic secular ideology from a religious standpoint. 3 s.h. Mr. Lacy
194. *The Protestant Church and American Culture*. Analysis from the perspective of Christian ethics of current problems in the interpenetration of Church and culture with explicit reference to the parish setting. 3 s.h. Mr. H. Smith
292. *Christian Ethics and International Relations*. An examination of Christian attitudes toward such issues as war and peace, the rule of law, foreign aid, and human rights; and the Church's contribution to international policies and institutions. 3 s.h. Mr. Lacy
333. *Seminar: Marxist Ideology and Christian Faith*. Comparative study of Communist and Christian doctrines of man, society, sin, history, ethics, and eschatology. Prerequisite: C.E. 190 or equivalent. 3 s.h. Mr. Lacy
389. *Christian Ethics and Contemporary Culture*. A study of the interaction between Christian thought and current secular social theory. Prerequisite: C.E. 27 or its equivalent. 3 s.h. Mr. Beach
390. *Current Problems in Christian Ethical Theory*. A critical study, seminar style, of dominant issues in Christian Ethics, through an analysis of a variety of contemporary Christian treatments of such problems as love, justice, community and vocation. Prerequisite: C.E. 27 or its equivalent. 3 s.h. Mr. Beach
391. *Historical Types of Christian Ethics I*. A critical study of representative statements of Christian ethical theory, through the early Reformation. Prerequisite: C.E. 27 or its equivalent. 3 s.h. Mr. Beach
392. *Historical Types of Christian Ethics II*. A continuation of C.E. 391, from the Reformation through current Christian ethical theory. Prerequisite: C.E. 391. 3 s.h. Mr. Beach
393. *The Christian Interpretation of History*. A comparative examination of the chief secular and Christian theories of history current in Western thought. For advanced students. Prerequisite: C.E. 27. 3 s.h. Mr. Beach
394. *Christianity and the State*. The relation of the Christian theory of the State to political problems with special consideration of the religious assumptions underlying democratic theory and practice, and of the relationship of Church to State. Prerequisite: C.E. 27. 3 s.h. Mr. Beach

IV. Professional Studies

The Care of the Parish

10. *The Church and the Minister's Vocation*. An orientation course for

beginning students, devoted to a consideration of the nature of the Church and the tasks of the ministry. 1 s.h. *Staff*

23. *The Care of the Parish*. A consideration of the pastor's function as leader of the Christian community. 3 s.h. *Mr. Ingram and Others*

146. *Church Building*. The role of the pastor in planning and executing building programs in the local church: architectural considerations and counsel, building requirements and plans. 2 s.h. *Mr. Nesbitt*

147. *Sociological Factors in American Religious Expression*. A study of cultural influences on religious expression as illustrated by the temperance movement, industrialization, New Thought, 20th century revivalism, ecumenism, the leisure revolution and other social phenomena. 2 s.h. *Mr. Schores*

148. *Christian Stewardship and Church Finance*. A seminar to consider the principles of stewardship education, budget making, enlistment in church support. 2 s.h. *Mr. Ingram*

150. *Church and Community*. The structure and dynamic factors shaping the present-day community together with their import for the work of the Church. 2 s.h. *Mr. Schores*

151. *The Town and Country Church*. The small church, the circuit church, circuit administration, larger parish and group ministry, and the Town and Country movement. 2 s.h. *Mr. Nesbitt*

152. *Evangelism and the Local Church*. A study of the nature, purposes and methods of contemporary Christian evangelism with special attention to the local church. 2 s.h. *Mr. Kale and Mr. Ingram*

153. *Pastoral Leadership in the Local Church*. A study of the pastor's role in determining the objectives and program of the local church with attention to planning for the church year. 2 s.h. *Mr. Ingram*

154. *The Urban Church*. The function, nature, program, and administration of the effective city church and of the urban minister's distinctive task. 2 s.h. *Mr. Ingram*

155a. *The Polity of the Methodist Church*. The history and present structure of the organization of The Methodist Church. 2 s.h. *Mr. Ingram*

155b. *The Polity of the Baptist Churches*.

155c. *The Polity of the Congregational-Christian Churches*.

155d. *The Polity of the Presbyterian Churches*. *Staff*

157. *Research and Survey for the Parish Minister*. An introduction to basic forms of sociological research as applied to the local church: self-evaluations, religious census, opinion polls, community surveys, use of secular resources and agencies. Field and laboratory methods will be explored through involvement in a research project. 2 s.h. *Mr. Schores*

Field Work Practicum I. Discussion of various aspects of parish work with opportunity for students to seek guidance respecting procedures and problems. Designed especially for students with parish responsibilities. (Fall Semester. Sections arranged.) 1 s.h. *Mr. Schores and Others*

Field Work Practicum II. Required of students expecting summer assignments under the Endowment and Field Work Program. Types of parish service to be discussed. (Spring Semester) 1 s.h. *Mr. Schores and Others*

Christian Education

22. Theology and Christian Nurture. The implications of theology and educational philosophy for the theory and practice of Christian education. 3 s.h. *Mr. Richey*

25. The Church and Christian Nurture. A constructive survey of the local church as a community of Christian nurture: Statement and evaluation of objectives, leadership and resource materials, structural patterns and administrative and supervisory procedures for the church school. 2 s.h. *Mr. Kale*

125. Theological and Psychological Interpretations of Man. (See C.T. 125)

126. Missionary Education in the Local Church. Practical programs for church school, audio-visual aids, preaching, stewardship, and special projects. 2 s.h. *Mr. Lacy and Others*

129. Religion and Personality. Investigation of religious aspects of the origins, structure, and development of selfhood. 3 s.h. *Mr. Richey*

149. The Ministry to the Campus. An examination of the circumstances which have produced, and the unique problems which confront, the ministry on the campus, considered from the perspective of the Christian idea of higher education. 3 s.h. *Staff*

161. Teaching Methods. Basic teaching procedures required by professional and lay workers in the local church. Opportunities are arranged for observation and guided practice in church schools, and/or other institutions. Required for candidates for the M.R.E. degree. 3 s.h. *Mr. Kale*

162. Curriculum Building in the Local Church. An examination of influential theories of and contemporary trends in curriculum construction, together with an evaluation of existing curricula. Actual designing of short units for use in the local church. 3 s.h. *Mr. Kale*

164. Christian Education of Children. The organization and administration of the work of the church with children of the nursery, kindergarten, primary and junior age groups. 2 s.h. *Mr. Kale*

165. Christian Education of Youth. The organization and administration of the youth program in the local church. 2 s.h. *Mr. Kale*

166. Christian Education of Adults. A study of the needs of adults; the materials, methods, and principles of organization for the Christian education of adults. 2 s.h. *Mr. Kale*

167. Theology and the Laity. A study of contemporary lay movements and centers, the ministry and mission of the laity in Church and world,

and the ministry of teaching in the lay renewal of the Church. (For Mid-
dlers and Seniors.) 3 s.h. *Mr. Richey*

169. *Theories of Christian Education.* A critical investigation of current
theories of Christian education. 2 s.h. *Mr. Richey*

Christian Education Practicum. Required of M.R.E. candidates. One
class per week and supervised project. 3 s.h. *Mr. Kale and Others*

Pastoral Care

26. *Introduction to Pastoral Care.* The psychology of personal adjust-
ment and pastoral care. An approach to pastoral care and its place in the
pastor's total ministry grounded in an understanding of the dynamics of
personal adjustment. 3 s.h. *Mr. Goodling and Mr. Williamson*

170. *Introduction to Pastoral Counseling.* The philosophy and tech-
niques of formal counseling through discussions of textual and interview
material. Prerequisite: P.C. 26. 3 s.h. *Mr. Goodling or Mr. Williamson*

171. *Pastoral Care Practicum I.* Pastoral Calls and Personal Counseling.
A study of pastoral calling and personal counseling in the parish ministry.
Prerequisites: P.C. 26 and 170. 2 s.h. *Staff*

172. *Pastoral Care Practicum II.* Marriage and the Family. A consid-
eration of pre-marital and marital counseling and the psychodynamics of
family life. Prerequisites: P.C. 26 and 170. 2 s.h. *Mr. Williamson*

173. *Pastoral Care Practicum III.* The Chaplain in a Rehabilitation
Program. The ministry to those in alcoholic and correctional institutions.
Prerequisites: P.C. 26 and 170. 2 s.h. *Staff*

174. *The Church and Mental Health.* The meaning of the self and the
resources of the church in doctrine and worship in self-fulfillment. 2 s.h.
Mr. Goodling

175. *Advanced Pastoral Care Practicum.* For advanced students who
want additional clinical experience in one of the Pastoral Care Practicum
areas. Consent of the instructor is required. Students may register for
from 1 to 5 s.h. clinic credit. *Staff*

176. *Pastoral Care Practicum IV.* The Psychiatric Setting. Lectures by
staff and ward visits at the Dorothea Dix Hospital in Raleigh. The place
of the minister in a program dealing with the causes, treatment, and pre-
vention of mental illness. Prerequisites: P.C. 26 and 170. 3 s.h. *Mr.
Steining*

177. *Pastoral Care Practicum V.* The Hospital Ministry. Pastoral care
and counseling with the ill, the dying, bereaved. Prerequisites: P.C. 26
and 170. 2 s.h. and 1 s.h. clinic. *Staff*

179. *Pastoral Care Practicum VI.* Pastoral Care and Persons in Institu-
tions. Staff lectures and ward visits at the Murdoch Center (for the
mentally retarded) and other facilities in the Butner, N.C. complex. 3 s.h.
Staff

188. *Science, Faith and Psychoanalysis*. An analysis of the fundamental categories of the Christian message and psychoanalysis. An exploration into the objectives and the methods of science and the meaning of religion. 3 s.h. Mr. Williamson

271. *Clinical Pastoral Training I*. Out-Patient Counseling under psychiatric supervision. 4 s.h. Staff

273. *Clinical Pastoral Training II*. The Chaplain in a Rehabilitation program. Twenty hours of supervised clinical training weekly in a rehabilitation institution. 4 s.h. Staff

276. *Clinical Pastoral Training III*. The Chaplain in a Psychiatric Setting: the mental hospital.

276A. Full-time 12-week summer quarter. 6 s.h. Staff

276B. Twenty hours per week, fall semester. 4 s.h. Staff

276C. Twenty hours per week, spring semester. 4 s.h. Staff

277. *Clinical Pastoral Training IV*. The Chaplain in the General Hospital setting.

277A. Full-time 12-week summer quarter. 6 s.h.

277B. Twenty hours per week, fall semester. 4 s.h.

277C. Twenty hours per week, spring semester. 4 s.h. Staff

The Church at Worship

34. *Workshop in Communication*. Intensive drill in voice, diction, speaking and reading. Enrollment by recommendation of teaching faculty. 1 s.h. Mr. Rudin

Preaching

29-30. *Sermon Construction—Theory and Practice*. An investigation of the theory of preaching (first semester). Detailed work in practice preaching and a clinical session each week on the application of theory (second semester). 3 s.h. Mr. Hall

31. *Advanced Sermon Practice*. A weekly session of clinical exercises in expository preaching and sermon evaluation for senior students of Vocational Group I. Prerequisite: Pr. 29-30. 1 s.h. Staff

181. *Practical Problems in Preaching*. Analysis of selected sermons and discussion of problems facing the preacher in the pulpit. Prerequisite: Pr. 29. 2 s.h. Mr. Hall

183. *Expository Preaching—Old Testament*. The exegesis and exposition of selected Old Testament passages for homiletical purposes. Prerequisite: Pr. 29. 2 s.h.

184. *Expository Preaching—The Pauline Epistles*. A study for homiletical purposes of the religious experience and theology of Saint Paul and its influence on ethical theory and practice. Prerequisite: Pr. 29. 3 s.h.

185. *Expository Preaching—Non-Biblical*. An evaluation of drama,

poetry and fiction for homiletical purposes. Prerequisite: Pr. 29. 2 s.h.
Mr. Rice

187. Pre-Reformation Preaching. Sermons, handbooks, and other historical sources studied in relation to Biblical preaching and the liturgical church, the problem of popular ministry and the issues of Christian reform. Prerequisite: C.H. 13. 2 s.h. *Mr. Petry*

193. Theology and Preaching. An examination of the relation of systematic theology and homiletical presentation in the sermons of major Christian leaders, past and present. 3 s.h. *Mr. Hall*

Worship and Church Music

134. Liturgical Reading. Practice in reading the liturgical materials of the pastoral ministry: Scriptures, prayers, and the rites and seasonal services in the Methodist *Book of Worship*. 2 s.h. *Mr. Rudin*

141. The Classic Age of the English Hymn. Eighteenth century development of the English hymn with special reference to Watts and the Wesleys, their precursors and successors. 2 s.h. *Mr. Baker*

178. Corporate Worship. The theory and practice of the common worship of the Church, using various manuals of worship. 2 s.h. *Mr. Rudin*

180. Church Music. A two-fold study including: (1) A survey of the great monuments of church music, (2) Musicianship, songleading and basic conducting; with an emphasis upon the use of the hymn tunes and other music in the Methodist hymnal. 3 s.h. *Mr. Hanks*

Chapel Choir. Students who successfully complete C.W. 180 before graduation may qualify for credit (to the limit of 2 s.h.) of $\frac{1}{2}$ s.h. for each semester of effective participation in the Chapel Choir. Choir membership (granted by audition) affords opportunity for study of the history and background of church music, and practical consideration of it in the context of public worship. *Mr. Hanks*



The Summer Session of the Divinity School

Summer—1966

Class enrollments will be controlled as occasion may arise so as to secure a fairly even distribution among the courses offered in each term.

First Term: (Registration June 13, Classes begin June 14 and end July 18)

105 (DS) *Studies in Paul*. An investigation of Paul's apostolate based upon the Acts and the Epistles with attention to Paul's theology as reflected in selected passages. 9:20-10:40. 3 s.h. Mr. Efrd

114 (DS) *Christian Social Ethics*. The principles of Christian social policy with reference to domestic, social, political, and economic patterns of contemporary culture. 7:40-9:00. 3 s.h. Mr. H. Smith

320 (DS) *Seminar: Friedrich Schleiermacher*. Critical examination of the dogmatic system. 11:00-12:20. 3 s.h. Mr. Herzog

Second Term: (Registration July 20, Classes begin July 21 and end August 24)

102 (DS) *Christian Apologetics and Modern World Views*. A constructive approach to the Hebrew-Christian understanding of Creator and

creature in the light of contemporary scientific knowledge. 11:00-12:20.
3 s.h. Mr. Robinson

170 (DS) *Introduction to Pastoral Counseling*. The philosophy and techniques of formal counseling through discussions of textual and interview material. 9:20-10:40. 3 s.h. Mr. Williamson

College of Engineering



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The Profession of Engineering

Engineering has been defined as the profession in which a knowledge of mathematics and the natural sciences is applied to develop ways of utilizing economically the materials and forces of nature for the well-being of mankind. As a *science* it involves mathematics and the natural sciences, as an *art* it involves human imagination and judgment. It is interdisciplinary, and it invokes both the processes of analysis and creative synthesis. The engineer works at the level of principles and concepts, and he seeks to achieve an optimum combination of basic concepts to yield imaginative new solutions to problems.

Engineering has, throughout history, continually interacted with the rest of human society in a highly determinative way. Its influence is evident in the very fabric of our culture. Engineering has provided the means for feeding, clothing, and sheltering mankind. It has largely freed men's bodies from physical drudgery and their minds from the slavery of routine mental effort. It has provided the tools of new scientific discovery, as well as those of new art forms. It has provided the means for bringing to mankind everywhere the results of the creative efforts of the great artists, writers, scientists, and philosophers of both ancient and modern times. It has placed man in close contact with his fellowmen throughout the world, and is now about to place man on the moon. The modern engineer must be broad, as well as deep, in his knowledge and interests, and his education must reflect this fact.

General Information

Engineering at Duke University

Duke University, a privately-supported, church-related (Methodist) institution, has about 6,800 students enrolled in nine schools and colleges. The students annually represent nearly every state and approximately 25 foreign countries. There are now more than 34,000 alumni in 70 nations. The University is a member of the Southern Association of Colleges and Schools, and of the Association of American Universities, which consists of 41 outstanding institutions.

Within the University, the College of Engineering offers programs of instruction and research at all three degree levels: bachelor's, master's, and doctor's. These educational programs in engineering are directed toward the objective of producing engineers who:

- a. are equipped to function at the highest professional level, not only today but for several decades, regardless of the scientific advances that the future may bring, with a fundamental understanding both of the *science* of engineering, which is based on mathematics and the physical sciences, and of the *art* of engineering, which depends on human imagination and judgment;
- b. can function intelligently within the economic and social framework of our culture—able to look from the past through the present into the future in terms of material wants and needs, and who are able to

organize the human effort and financial resources necessary to provide the machines, goods, structures, and services that will meet those needs and wants;

- c. recognize their responsibilities as citizens of their communities; and
- d. seek to continue aesthetic, ethical, intellectual, and spiritual growth.

Both on the campus and in the classroom the emphasis is on the individual. To this end classes are kept small and close contact is maintained between professor and student. As a matter of policy, the College is relatively small, with an undergraduate enrollment of about 500. Master's and doctor's work in engineering is offered through the Graduate School of Arts and Sciences.

History

The College of Engineering traces its origin to 1887, when instruction in engineering subjects was begun by Trinity College. With the establishment of Duke University the program in engineering rapidly evolved to its present status through a series of steps that included the formation of separate departments in civil and electrical engineering in 1927, the formation of a separate department in mechanical engineering in 1931, the establishment of the Division of Engineering, with the three departments as components, in 1937 and, finally, the incorporation of this Division into the University structure in 1939 as the College of Engineering, one of the three coordinate undergraduate colleges of Duke University. The Master of Science degree with a major in engineering was authorized in 1956 and the Doctor of Philosophy was authorized in electrical engineering in 1960 and in civil engineering in 1964, both through the Graduate School of Arts and Sciences.

Relationship to the University

As part of the University community, students in the engineering programs share in a total educational experience that only a major university can provide. The College of Engineering shares the same campus with Trinity College, the Graduate School of Arts and Sciences, the Divinity School, and the Schools of Forestry, Law, Medicine.

Organization

The affairs of the College of Engineering are administered by the Dean of the College, with the assistance of an Executive Committee which

includes the Associate and Assistant Deans and the Chairmen of the three Departments of Engineering. The legislative body of the College is the Engineering Faculty Council, which has responsibility for the curriculum and for determining policies in those academic matters that pertain exclusively to the College. The affairs of each department of engineering are administered by the Chairman of that Department, with the assistance of the Department Faculty. Much of the administrative work of the College is carried out with the assistance of faculty committees.

The graduate programs are administered by the respective engineering departments under the coordination of the Associate Dean for Graduate Study and Research and through the Graduate School of Arts and Sciences.

Physical Plant

The entire College is in a single building on the West Campus. It was first occupied in January 1948. Each of three wings houses the instructional and research laboratories and the special classrooms of one of the three engineering departments. The main portion of the building has offices, classrooms, and other general facilities including a library of some 35,000 volumes and 450 periodicals; an auditorium where audio-visual instruction can be given to large groups; conference rooms and seminar rooms; a student lounge; design rooms; facilities for reproducing copy of various types; a central precision shop; and central, as well as departmental, analog computation facilities.



Programs of Study and Requirements for Degrees

The College offers fully-accredited curricula leading to the degree of Bachelor of Science in Engineering (B.S.E.), with majors in civil, electrical, or mechanical engineering and in selected interdisciplinary areas. Through the Graduate School of Arts and Sciences it also offers work leading to the degree of Master of Science (M.S.) in civil, electrical, or mechanical engineering, and to the degree of Doctor of Philosophy (Ph.D.) in civil or electrical engineering.

Undergraduate Degree Offered

Bachelor of Science in Engineering

Beginning with the entering class in September, 1965, the College offers a four-year program leading to the degree of Bachelor of Science in Engineering (B.S.E.), with opportunity for majors in the professional fields of civil, electrical, or mechanical engineering, as well as for programs in interdisciplinary fields such as bioengineering, engineering mechanics, energy conversion, materials, and systems and controls.

For graduation with a bachelor's degree in engineering, a minimum of

134 semester hours* of course work must be completed including the following:

English. 6 s.h. This requirement is met by the completion of English 1-2.

Mathematics. 15 s.h. This requirement is met by completion of Mathematics 21, 22, 63, 64, and 111.

Natural Science. 16 s.h. This requirement is met by completion of Chemistry 1 and 2 and Physics 41 and 42.

Social Sciences and History. 6 s.h. This requirement may be satisfied by one of the following 6-hour sequences: Economics 1-2, or 51-52; History 1-2, or 51-52; Political Science 11-12 or 61-62; Psychology 91, to be followed by either Psychology 100 or 101; Sociology 91-92, or 93-94.

Humanities. 6 s.h. This requirement may be satisfied by 6 hours from the following: English 55-56, 57-58; Greek 121, 122; Latin 111, 112; all foreign language literature courses above 100 not given in translation; Philosophy 41-42, 93-94; Art 1-2, 51-52; Music 1-2, 51-52; Religion 1-2 or 51-52, 55, courses numbered 60-99.

Elective. 3 s.h. To be selected in consultation with adviser. Normally taken in freshman year.

Electives in Social Science, History, and Humanities. 6 s.h. In addition to the above, the student must elect a minimum of 6 semester hours of courses in social sciences, history, or humanities.

Physical Education. 4 s.h. Physical education is required during each of the first two years and is normally completed by the end of the sophomore year.

Departmental or Major Specifications. 37 s.h. In addition to the above requirements, 37 hours of courses in the third and fourth year are specified by the department in which the student is registered. A minimum of 16 hours of the 37 must be engineering courses of which 6 hours must be design-oriented studies.

Engineering Core Courses. 35 s.h. The normal engineering program includes 35 hours of engineering core courses and is met by completion of Engineering 1, 2, 23, 53, 63, 73, 83, 101, 113, 123, 133, 143, 163. Under special circumstances, a minimum of 10 hours of the normally required 16 hours of common-core engineering courses from the third- and fourth-year programs may be approved.

To provide the engineering student with the necessary background in

*A maximum of 6 hours of junior or senior level Air Science or Naval Science course work may be counted in satisfying the minimum requirements of 134 hours for a baccalaureate degree in engineering. These 6 hours may not be substituted for any of the above requirements in English, Social Sciences and History, Humanities, or electives in Social Sciences, History, and Humanities. All other credits earned in Air Science or Naval Science are taken in addition to the minimum program.

fundamentals upon which a variety of engineering programs of study can be based, and to relieve him of the necessity of committing himself immediately to a specific major branch of engineering, a common core of courses is provided for the freshman, sophomore, and part of the junior years.

Common-Core Program of Studies for the Degree of Bachelor of Science in Engineering

Freshman Year

First Semester

	s.h.
Chem 1—Gen. Inorg. Chemistry .	4
Engrg 1—Engineering Design I .	2
Approved elective	3
Engl 1—English Composition ..	3
Math 21—Introd. Calculus	3
PE—Physical Education	1
	16

Second Semester

	s.h.
Chem 2—Gen. Inorg. Chemistry .	4
Engrg 2—Engrg. Design II	2
Engrg 23—Statics	3
Engl 2—English Composition ...	3
Math 22—Introd. Calculus	3
PE—Physical Education	1
	*16

Sophomore Year

First Semester

	s.h.
†Engrg 73—Mechanics of Deformable Bodies	3
†Engrg 83—Structure & Properties of Solids	3
Humanities—Social Studies Elective	3
Math 63—Intermed. Calculus .	3
Phys 41—General Physics	4
PE—Physical Education	1
	17

Second Semester

	s.h.
†Engrg 53—Engrg Design III .	2
†Engrg 63—Introductory Electric Systems I	4
Humanities—Social Studies Elective	3
Math 64—Intermed. Calculus .	3
Phys 42—General Physics	4
PE—Physical Education	1
	17

*Freshman engineering students taking Air Science or Naval Science should schedule certain courses in addition to the 16 semester hours prescribed.

†The combination of Engrg 73 and 83 is interchangeable with the combination of Engrg 53 and 63.



Junior Year

<i>First Semester</i>	<i>s.h.</i>	<i>Second Semester</i>	<i>s.h.</i>
Humanistic-Social Studies		Humanistic-Social Studies	
Elective	3	Elective	3
*Engrg 113—Introductory Elec- tric Systems II	3	*Engrg 123—Dynamics	3
*Engrg 133—Heat Transfer ...	2	*Engrg 143—Fluid Mechanics .	2
Engrg 101—Thermodynamics .	3	†Engrg 163—Fields	3 or 0
Math 111—Appl. Math		**Departmentally Specified	
Analysis I	3	Courses	6 or 9
**Departmentally Specified			17
Course	3		
	17		

Senior Year

(See departmental programs: pages 10, 14, or 17.)

*Engrg 113 and Engrg 123 are interchangeable; Engrg 133 and Engrg 143 are interchangeable.

†May be scheduled in semester 6, 7, 8, or 9. (A small group of students will be invited to enroll in an experimental section of a course involving an integrated approach to the topics of fields, heat transfer, and/or fluids.)

**To be taken from approved programs in professional fields of civil, electrical, or mechanical engineering. Work may also be arranged in interdisciplinary fields such as bioengineering, engineering mechanics, energy conversion, materials, systems and controls.

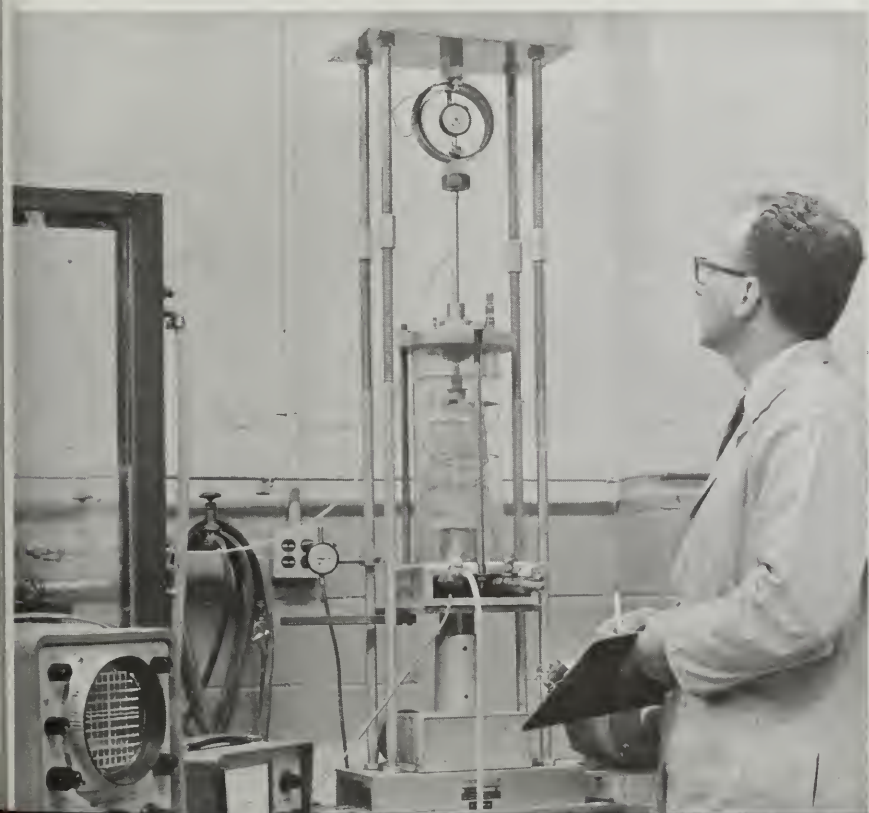


Department of Civil Engineering

Although the scope of the civil engineering profession is very broad, its work may be classified into five major fields: *hydraulics*—flood control, river and harbor improvements, irrigation, drainage, and water power; *land utilization*—development of communities, industrial sites, and existing cities; *sanitary engineering*—public health, water supply, and waste disposal; *structures*—bridges, buildings, foundations, dams, tunnels, tanks, thin shells, and missile structures; *transportation*—railroads, highways, airports, waterways, pipelines, and traffic control.

The concern of the civil engineer is primarily with conception, design, and construction, although his responsibility often includes management and maintenance. His undergraduate education comprises scientific, technical, civic, and cultural subjects. In order that he may become qualified to assume responsible charge of engineering work, he must supplement this instruction with progressive study after he graduates and while he is securing his practical experience.

The *Mechanics of Materials Laboratory* is equipped to give instruction in the basic principles of stress and strain and for the testing of structural members. Its facilities are adequate for both graduate and undergraduate instruction. Included in this laboratory are three universal testing machines with capacities from 5,000 to 400,000 pounds; various hardness testers; machines for testing torsion, fatigue, and impact; calibration ap-



paratus; and a variety of modern strain gages of direct acting mechanical and electric-resistance types.

The *Materials Laboratory* has the equipment necessary for both research and instruction in the physical properties and stress-deformation characteristics of bituminous mixtures, concretes, and soils.

For advanced instruction in *Stress Analysis* there are various polariscopes with facilities for taking and developing pictures, large-sized Begg's deformeter, loading frames, and miscellaneous tools for preparing accurate models for testing. Modern electrical and mechanical instrumentation is available for strain measurements.

The department has an unusually modern and representative collection of *Surveying Equipment*: transits, levels, plane tables, accessory equipment, precise levels and theodolites.

The *Sanitary Engineering Laboratory* is equipped for instruction and research in the characterization of waters and wastewaters, and in the application of biological, chemical and physical measurements to the solution of technical problems relating to environmental health.

For *Digital Computer Programming*, departmental card punch equipment using the ALGOL and FORTRAN languages is available.

Program of Study in Civil Engineering for the Bachelor of Science in Engineering Degree

This program became effective with the class that entered in Sept., 1965.

For uniform *freshman* and *sophomore* program see page 7.

Junior Year

<i>First Semester</i>	<i>s.h.</i>	<i>Second Semester</i>	<i>s.h.</i>
Δ *Humanistic-Social Studies		Δ *Humanistic-Social Studies	
Elective	3	Elective	3
*Engrg 113 Introductory		*Engrg 101 Thermodynamics .	3
Electric Systems II	3	*Engrg 133 Heat Transfer ...	2
*Engrg 123 Dynamics	3	CE 96 Measurements	3
*Engrg 143 Fluid Mechanics .	2	CE 123 Hydraulic Engrg	3
*Math 111 Applied Math		Δ Approved Elective	3
Anal. I	3		17
CE 131 Structural Mech. I ..	3		
	<u>17</u>		

Δ Part of a program of electives planned with departmental approval to suit the interests and abilities of the individual student. The program will include a minimum of 6 semester hours of either economics or political science. The program will also include a minimum of 9 semester hours in mathematics, the natural sciences, or other technical subjects; English 93 will normally be part of these 9 semester hours.

*Common-Core Courses.

Senior Year

First Semester

	<i>s.h.</i>
Δ * Humanistic-Social Studies	
Elective	3
CE 118 Materials	2
CE 124 Sanitary Engrg.	3
CE 133 Structural Design I ..	3
CE 139 Soil Mechanics	3
Δ Approved Elective	3
	<u>17</u>

Second Semester

	<i>s.h.</i>
Δ * Humanistic-Social Studies	
Elective	3
CE 116 Transportation	3
CE 134 Struct. Design II	3
CE 150 Engrg. Systems	2
† Engrg 163 Fields	3
Δ Approved Elective	3
	<u>17</u>

Under special circumstances, a minimum of 22 semester hours of the normally required 28 semester hours of Civil Engineering courses may be approved by the Director of Undergraduate Studies.

First Graduate Year

The Master of Science program is planned as the fifth year of a five-year sequence of studies. Admission to the Master's program follows completion of the requirements for the Bachelor of Science in Engineering degree (at Duke University), or its equivalent (from another institution), and is contingent upon admission to the Graduate School of Arts and Sciences.

First Semester

	<i>s.h.</i>
CE 200- or 300-level course ..	3
CE 200- or 300-level course ..	3
** Minor Course	3
Approved elective course ...	3
Thesis research	3
	<u>15</u>

Second Semester

	<i>s.h.</i>
CE 200- or 300-level course ..	3
CE 200- or 300-level course ..	3
** Minor Course	3
Approved elective course ...	3
Thesis research	3
	<u>15</u>

Subsequent Graduate Study

For further information concerning work leading to the M.S. degree, as well as that leading to the Ph.D. degree, refer to the sections of this Bulletin, beginning on pages 51 and 68.

Δ Part of a program of electives planned with departmental approval to suit the interests and abilities of the individual student. The program will include a minimum of 6 semester hours of either economics or political science. The program will also include a minimum of 9 semester hours in mathematics, the natural sciences, or other technical subjects; English 93 will normally be part of these 9 semester hours.

* Common-Core Courses.

† Engrg 163 may be delayed to the first semester of the fifth year.

** Normally Mathematics or Natural Science.

Department of Electrical Engineering

Electrical Engineering utilizes the electrical and magnetic forces of nature and properties of matter to supply human needs. To an increasing degree its products and services influence the daily living of most of the world's population. It is concerned with the *processing and transmitting of information*—as in radar, television, radio and wire telephony, measurement, electronics, computation, and control. It is equally concerned with the *processing, transmitting, and controlling of energy*—as in solid state converters, magnetohydrodynamic generators, nuclear reactors, rotating machines, power systems, and automatic industrial processes. It provides most of our labor-saving home appliances and many of the instruments of modern scientific research and of modern medical practice.

The professional electrical engineer may engage in consulting, teaching, research, development, design, manufacturing, operation, maintenance, management and sales. His education must therefore provide a fundamental understanding of both the science of electrical engineering, which is based on mathematics and the physical sciences, and the art of electrical engineering, which depends on human imagination and judgment. It must also prepare him to serve as a responsible member of society by providing him with an appreciation of the humanities and the social sciences.

The program in electrical engineering at Duke, therefore, does not stress the mere acquisition of specific skills and methods, but seeks, in both classroom and laboratory, to stimulate students to think creatively in terms of fundamental concepts. It is hoped that, once started, creativity may become a habit.

Such a program requires an able staff, extensive library resources, and well-equipped laboratories, such as are found here. Some idea of the range of interests in electrical engineering which are included in this program may be conveyed by a brief survey of the laboratory activities of the Department.

In the *Fields and Circuits Laboratory* the configurations of two- and three-dimensional fields are studied by several different analog techniques. Complex network functions are studied by means of an electrolytic tank mapper. Nonsinusoidal waves are synthesized and analyzed, and oscillographic studies are made of both steady-state and transient behavior of direct-current circuits and single-phase and polyphase alternating-current circuits.

The *Solid-State Materials Laboratory* is well-equipped for both instructional and research projects in which the macroscopic properties of materials, as exploited in devices, are studied at the microscopic and molecular levels. An X-ray diffraction diffractometer, a 9½-inch magnet, a

spin-echo spectrometer, a vacuum deposition system, and metallurgical and stereoscopic microscopes are utilized in this work.

In the *Ferromagnetics Laboratory* investigations are being conducted into such properties of ferromagnetic materials as magneto-thermal, magneto-optical, magneto-resistive and magneto-strictive effects.

Research in the *Superconducting Circuits and Thin-Films Laboratory* is directed toward exploiting for engineering application some of the unique physical phenomena which are observed to obtain at temperatures in the vicinity of absolute zero. Related thin-film research is in progress. A major facility of this laboratory is an electron microscope providing a resolution of $7\text{\AA}$.

The *Electronics Laboratories* are equipped for the study of the physical behavior of basic electronic components and of advanced electronic devices throughout the sub-radio frequency region.

In the *Radio-Frequency Laboratory* studies are made of radio-frequency systems and their component parts throughout the radio-frequency spectrum. Applications to television and radar are shown.

In the *Energy Conversion Laboratory* the principles of generation, transformation, and control of energy are studied as they are applicable to large-scale power systems and small self-contained systems. Thermo-electric generators, photovoltaic sources, transformers, a-c and d-c motors and generators, and their associated controls are included in this work.

In the *Automatic Control Systems Laboratory* studies are made of the principles underlying the fields of instrumentation and automatic control. Modern, high-performance equipment is available for synthesizing control systems and for determining control system performance.

The *Computer Laboratory* contains two general-purpose electronic analog computers. These devices are used in solving higher-order differential equations that are descriptive of the dynamic behavior of complex physical systems. A card-punch machine is available for use in programming problems for solution on the digital computer at the University Digital Computer Laboratory.

In the work of the *Spacecraft Systems Laboratory* principles from all phases of electrical engineering are brought to bear upon problems encountered in modern spacecraft technology.

In the *Spacecraft Telemetry Systems Laboratory* research centers on crosscorrelation techniques for the recovery of information contained in noisy signals received from scientific satellites and space probes.

Through *Amateur Radio Station W4AHY*, which is licensed to operate on the popular amateur bands using both voice and code transmission, interested engineering students who hold licenses may gain practical experience in short-wave radio.

Program of Study in Electrical Engineering for the Bachelor of Science in Engineering Degree

This program became effective with the class that entered in September, 1965.

For uniform *freshman* and *sophomore* program see page 7.

Junior Year

<i>First Semester</i>		<i>Second Semester</i>	
	<i>s.h.</i>		<i>s.h.</i>
Δ *Humanistic-Social Studies		Δ *Humanistic-Social Studies	
Elective	3	Elective	3
*Engrg 113 Introd. Electric Systems II	3	*Engrg 101 Thermodynamics .	3
*Engrg 123 Dynamics	3	*Engrg 133 Heat Transfer . . .	2
*Engrg 143 Fluid Mechanics .	2	*Engrg 163 Fields	3
*Math 111 Appl. Math Anal. I	3	Math Elective beyond Math 111	3
Phys 161 Modern Physics . . .	3	EE 161 Electronics and Signals	3
	<u>17</u>		<u>17</u>

Senior Year

<i>First Semester</i>		<i>Second Semester</i>	
	<i>s.h.</i>		<i>s.h.</i>
Δ *Humanistic-Social Studies		Δ *Humanistic-Social Studies	
Elective	3	Elective	3
EE 162 Electromechanical Energy Conversion	2	EE 167 Design Colloquium .	2
EE 163 Physical Electronics .	3	Δ EE Elective	3
EE 164 Electromagnetic Fields and Waves	3	Δ Approved Elective	3
Δ Approved Elective	3	Δ Approved Elective	3
Δ Approved Elective	3	Δ Approved Elective	3
	<u>17</u>		<u>17</u>

First Graduate Year

The Master of Science program is planned as the fifth year of a five-year sequence of studies. Admission to the Master's program follows completion of the requirements for the Bachelor of Science in Engineering degree (at Duke University), or its equivalent (from another institution),

Δ Part of a planned program of electives to be chosen in consultation with the Advisor.

° Common-Core Courses.

and is contingent upon admission to the Graduate School of Arts and Sciences.

<i>First Semester</i>		<i>Second Semester</i>	
	<i>s.h.</i>		<i>s.h.</i>
EE200- or 300-level course ...	3	EE200- or 300-level course ...	3
EE200- or 300-level course ...	3	EE200- or 300-level course ...	3
†Minor course	3	†Minor course	3
Approved elective course	3	Approved elective course	3
Thesis research	3	Thesis research	3
	<u>15</u>		<u>15</u>

Subsequent Graduate Study

For further information concerning work leading to the M.S. degree, as well as that leading to the Ph.D. degree, refer to the sections of this Bulletin, beginning on pages 51 and 73.

Department of Mechanical Engineering

The Mechanical Engineer is concerned with the design and construction of equipment to convert energy from natural sources into useful work and to utilize energy effectively to process goods. He is also concerned with the organization of men and machines for the manufacture of products. To fulfill these functions, the mechanical engineer must possess a thorough knowledge of the basic sciences and be adept in using this knowledge to find optimum solutions to the problems with which he is confronted. In general, he would pursue a career in one of the following comprehensive fields: (1) research, development and design; (2) production, manufacturing and operation; and (3) management.

The mechanical engineering curriculum at Duke University provides a balance between basic sciences, mathematics, engineering sciences, social sciences, humanities and professional engineering courses. Flexibility is provided in the form of electives by which the student may emphasize particular goals of his own choosing. The elective programs may be chosen to provide a strong minor in mathematics, the physical sciences, economics, or the humanities. Outstanding students may elect in their senior year projects which test and develop their ability to do research work.

Digital computer programming is introduced at the freshman level and is used in regular course work throughout the remaining years. Programs are prepared by students and are processed on the large-scale computer in the adjacent Mathematics-Physics Building.

†Normally Mathematics or Natural Science.

The department has several small *analog computers*, and participates in the central facility of the College.

The laboratories provide facilities both for undergraduate instruction and for graduate level research in each of the major fields of mechanical engineering. Instrumentation includes many cathode-ray oscilloscopes, analog computers, strain-gage bridges, hot-wire anemometers, recording oscillographs, and photographic equipment.

A modern, well-equipped *materials laboratory* is available for examining the structures of materials and relating these to the properties of the materials and to the methods of processing. Polymers and ceramics, as well as naturally-occurring materials, may be prepared and examined with the facilities available. In addition, testing equipment and furnaces are provided for determining the effects on properties of changes induced by heat treatment.

Basic *thermodynamic experiments* are performed on such apparatus as a large single-stage air compressor, steam turbines, heat exchangers, experimental refrigeration equipment and *internal combustion engines*, including Diesel and automotive engines. A CFR variable compression-ratio engine, in a separate laboratory with complete control and testing equipment, is available for further investigations. Indicator diagrams can be obtained either through electronic strain-gages or with purely mechanical devices.

Heat flow problems are studied by determining temperature distributions on actual equipment. The results are compared with those obtained from analog water tanks, digital computer calculations, and an electric analog system.

The *flow of fluids* is studied on a water table equipped for shock wave investigations and on supersonic flow apparatus, as well as with an assortment of the fans, nozzles, and pumps commonly found in such laboratories.

The behavior of *mechanical systems* is an area of rapidly growing importance in mechanical engineering. Several simple systems have been built for undergraduate study of vibratory and basic feedback control phenomena, while more elaborate systems are used for advanced study. Auxiliary equipment available includes vibration tables and shakers and a shock stand as well as pickups of several varieties, amplifiers, recorders and the analog computers.

Shop facilities are available to support student as well as faculty projects and for special instruction.

Program of Study in Mechanical Engineering for the Bachelor of Science in Engineering Degree

This program became effective with the class that entered in September, 1965.

For uniform *freshman* and *sophomore* program see page 7.

Junior Year

First Semester

	<i>s.h.</i>
Δ *Humanistic-Social Elective . . .	3
*Engrg 123 Dynamics	3
*Engrg 101 Thermodynamics . . .	3
*Engrg 143 Fluid Mechanics . . .	2
*Math 111 Applied Math.	
Anal. I	3
ME 133 Mechan. Design I . . .	3
	<u>17</u>

Second Semester

	<i>s.h.</i>
Δ *Humanistic-Social Elective . . .	3
*Engrg 113 Introductory Elec- tric Systems II	3
*Engrg 133 Heat Transfer . . .	2
Math Elective Beyond Math	
111	3
ME 102 Thermo II	3
Phys 161 Modern Physics . . .	3
	<u>17</u>

Senior Year

First Semester

	<i>s.h.</i>
Δ *Humanistic-Social Studies	
Elective	3
ME 134 Mechanical Design	
II	2
ME 136 Response of Systems . .	3
ME Elective	6
Δ Approved Elective	3
	<u>17</u>

Second Semester

	<i>s.h.</i>
Δ *Humanistic-Social Studies	
Elective	3
ME 161 Mech. Engrg. Lab. . .	2
ME Design Elective	3
ME Elective	6
Δ Approved Elective	3
	<u>17</u>

First Graduate Year

The Master of Science program is planned as the fifth year of a five-year sequence of studies. Admission to the Master's program follows completion of the requirements for the Bachelor of Science in Engineering degree (at Duke University), or its equivalent (from another institution), and is contingent upon admission to the Graduate School of Arts and Sciences.

First Semester

	<i>s.h.</i>
ME 200- or 300-level course . . .	3
ME 200- or 300-level course . . .	3
†Minor course	3
Approved elective course . . .	3
Thesis research	3
	<u>15</u>

Second Semester

	<i>s.h.</i>
ME 200- or 300-level course . . .	3
ME 200- or 300-level course . . .	3
†Minor course	3
Approved elective course . . .	3
Thesis research	3
	<u>15</u>

Δ Part of a planned program of electives to be chosen in consultation with the Advisor.

*Common-Core Courses.

†Normally Mathematics or Natural Science.

Interdisciplinary Major

This major would parallel the majors in civil, electrical, and mechanical engineering and, subject to faculty approval, would be offered in areas such as bioengineering, engineering mechanics, energy conversion, materials, and systems and controls.

The following requirements would govern the interdisciplinary major:

1. The program shall meet the requirements of the Bachelor of Science in Engineering degree as outlined on pp. 5, 8, 10, 14, 16, and shall in addition contain the requirements:
 - (a) A minimum of 16 s.h. of engineering course work in addition to common-core courses must be taken in the third and fourth years, of which 6 s.h. must be design-oriented studies.
 - (b) Limitation shall be placed on the amount of work which can be taken in a given department during the third and fourth years so that the advantages of interdisciplinary studies may be realized.
2. Each student enrolled in an approved interdisciplinary program shall be assigned to an appropriate engineering department for administrative purposes.

Graduate Degrees Offered

Through the Graduate School of Arts and Sciences the College of Engineering offers work leading to the degree of Master of Science (M.S.) with a major in civil, electrical, or mechanical engineering, and to the Doctor of Philosophy (Ph.D.) degree with a major in civil or electrical engineering.

Master of Science and Doctor of Philosophy Degrees with a Major in Engineering

The graduate programs in engineering are designed to provide a fundamental understanding of the science of engineering, which is based on mathematics and the physical sciences, as well as a basic understanding of the art of engineering, which depends on human imagination and judgment. Each engineering graduate student consolidates his understanding through participation in seminars appropriate to his field of study.

A *minimum* of 30 units of earned graduate credit beyond the Bachelor's degree is required for the M.S. degree: 12 in engineering, 6 in related minor work (normally mathematics or natural science), 6 in either the major or minor subject or in other areas approved by the major depart-

ment and the Dean of the College of Engineering, and 6 for a research-based thesis. There is no language requirement for this degree.

A *minimum* of 60 units of earned graduate credit beyond the Bachelor's degree is required for the Ph.D. degree: 24 in engineering, 12 in related minor work (normally mathematics or natural science), 12 in either the major or minor subject or other areas approved by the major department and the Dean of the College of Engineering, and 12 for a research-based dissertation. In addition, a reading knowledge of two foreign languages which are relevant to the field of the dissertation is required (normally two of the following: French, German, or Russian).

Programs of Study in Civil Engineering for the Degrees of Master of Science and Doctor of Philosophy

A student may specialize in one of the following fields of study for either the M.S. or the Ph.D. degree with a major in Civil Engineering: engineering mechanics, hydraulic engineering, materials science, sanitary engineering, soil and foundation engineering, or structural engineering. Appropriate combinations of these fields are also encouraged.

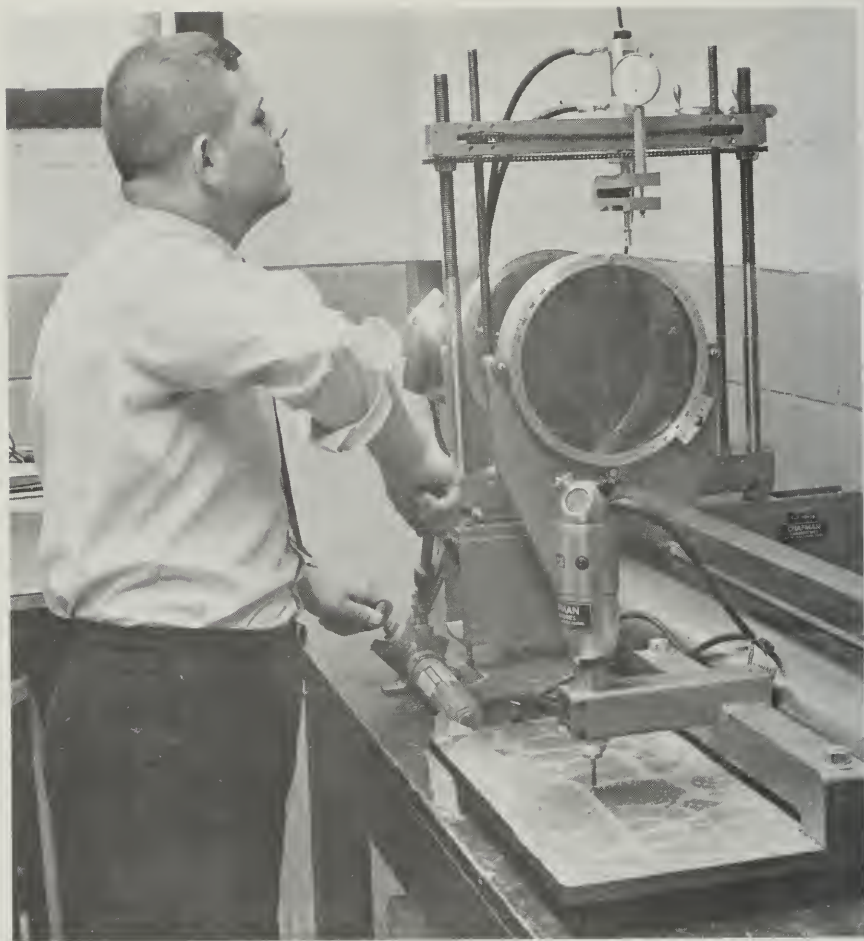
Under the Reciprocal Agreement with the Consolidated University of North Carolina a student may include, as a portion of the minimum requirements, work offered by the Department of Environmental Sciences and Engineering of the University of North Carolina. Although minor work normally is taken in the natural sciences or mathematics, a student whose major interest relates to the social sciences may take relevant minor work in this area.

A minimum prerequisite to the graduate program in civil engineering is a basic knowledge of mathematics through linear differential equations, materials science, solid mechanics, and fluid mechanics.

Programs of Study in Electrical Engineering for the Degrees of Master of Science and Doctor of Philosophy

A student may specialize in any one of the following fields in working toward either the M.S. or the Ph.D. degree with a major in Electrical Engineering: solid-state materials and devices; ferromagnetics; superconducting circuits; instrumentation; electronics; microwaves; computers and automatic control; energy conversion; information processing; and biomedical engineering.

A minimum prerequisite to the graduate courses in electrical engineering is a basic knowledge of differential equations, electric and magnetic field theory, and the theory of networks. A previous course in modern physics is recommended.



Program of Study in Mechanical Engineering for the Degree of Master of Science

Specialization in the following areas of study is available to students seeking the M.S. degree with a major in Mechanical Engineering: materials science; compressible and incompressible fluids; engineering mechanics; vibrations; heat transfer; and instrumentation. Emphasis is placed on the application of fundamental concepts of basic science and engineering science to mechanical design and analysis.

A minimum prerequisite to the graduate courses in mechanical engineering is a basic knowledge of differential equations, undergraduate thermodynamic theory, mechanics, and machine design.

Undergraduate Special and Cooperative Programs

Reserve Officers Training Corps

Through the Naval and Air Force Reserve Officers Training programs the University is cooperating with the Department of Defense in providing well-educated officers for the active and reserve forces of the nation.

The Naval Reserve Officers Training Corps

There are two basic programs through which students can qualify for Naval commissions upon graduation: one, the Regular Naval Reserve Officers Training Corps program, provides a maximum of four years in the University largely at government expense, followed by a commission in the regular Navy or Marine Corps; the other, the Contract program, leads to a commission in the Naval Reserve or the U. S. Marine Corps Reserve. Additional information may be found in the *Bulletin of Undergraduate Instruction*.

The Air Force Reserve Officers Training Corps

The unit functions as a regular department of instruction known as

the Department of Air Force Aerospace Studies. It selects, trains, and commissions college men who possess the requisite character, intelligence, desire, and sense of duty to become Air Force officers. Additional information may be found in the *Bulletin of Undergraduate Instruction*.

Advanced Placement Program

The colleges have arranged for course placement on the basis of good performance on either the Advanced Placement Examinations of the CEEB or—to a more limited extent—on placement tests given by Duke during Freshman Week. The College Board Advanced Placement Examinations are a vehicle to courses on the sophomore level or higher placement in botany, chemistry, English, French, German, history, Latin, mathematics, physics, Spanish, and zoology, whereas the Duke tests are used to decide such placement only in foreign languages and mathematics. A further distinction is that only the AP Examinations may lead to credit toward graduation for the course or courses omitted. The departmental directors of undergraduate study and the University Registrar are charged with the responsibility for evaluations leading to advanced placement of freshman matriculants.

Advanced Placement Examinations are given in May by the College Entrance Examination Board. Information regarding the tests may be obtained from the Board.

Study Abroad

A student contemplating study abroad should be guided by the provisions established by the Undergraduate Faculty Council and administered by the Committee on Study Abroad. For details, see *Bulletin of Undergraduate Instruction*.

Summer Study Abroad

Duke University, in cooperation with the Experiment in International Living, runs a summer program of study abroad in France, Germany, and Spain, open to all qualified Duke students. The program offers the opportunity to earn six to eight hours of academic credit. Participants are selected by the Committee on Study Abroad and the Experiment in International Living. Applications must be submitted before February 15 to qualify for the following summer group.

Eligibility for Special Curricular Programs

Reading-out of Introductory Courses

The option to “read” in order to by-pass introductory or pre-requisite courses is open to students of demonstrated academic ability to allow them to advance at their own pace to upper-level work. This opportunity ensures a richer program for the student who has few places in his curriculum for electives. Any student interested in reading during the summer to by-pass an introductory or pre-requisite course must be recommended by his dean and secure the permission of the department concerned. Reading for a course and auditing are mutually exclusive procedures. A proposed program of reading should be approved by the director of undergraduate studies in the department in which the work will be done. On passing a three-hour qualifying examination prepared by the department a student may be certified for advanced course work in the area. On completion of an advanced course, an entry will be made on his permanent record that he has passed a qualifying examination but no course credit is awarded. Interested students should request further information from the Dean’s Office.

Independent Study

Students who have a 3.0 quality point ratio overall and in their major may be permitted to enroll for independent study during their junior and senior years. A student need not be in a Graduation with Distinction program to enroll in independent study courses. The maximum credit allowed for independent study and honors research courses is three semester hours per semester during the junior year and six semester hours per semester during the senior year. Interested students should consult the Director of Undergraduate Studies in the department in which they wish to work.

Graduation with Distinction

Programs featuring independent study and other honors opportunities are available under the title Graduation with Distinction in all three departments. Although the details and requirements of the program vary from department to department, certain general requirements are uniform. Each department participating invites, at the end of their junior year, those students who have maintained at least a “B” average in the major field and an over-all average of “B” to enter the Graduation with Distinction Program. After participation in a senior seminar, and/or a directed course of reading, laboratory research, or other independent study, the student must embody the results of his individual research and study in



a distinguished piece of writing. The paper is assessed by a departmental committee which, if it approves, recommends that the student be Graduated with Distinction in his major field. Interested students should consult the Director of Undergraduate Studies in the appropriate department.

Reciprocal Agreement with the Consolidated University of North Carolina

Under a plan of cooperation between the Consolidated University of North Carolina and Duke University, students regularly enrolled at Duke University during the regular academic year, and paying full fees to that institution, may be admitted to a maximum of two approved courses per semester at the Consolidated University upon payment of a nominal registration fee of two dollars and of any other special fees regularly required of all students.

Student Life

Living Accommodations

As the undergraduate colleges of the University are resident institutions, all students are required to live in the residence halls. Any exceptions must be approved by the Dean of Men or the Dean of Women. Rooms are not rented for a shorter period than one semester. No refund of room rent will be made except for involuntary withdrawal to enter the armed services. Such refunds are made in accordance with the University's established schedule. (See *Financial Information* for living expenses.)

Housing

Undergraduate Men. Upon their admission to the College of Engineering, men students are sent detailed information by the University Housing Bureau concerning their obligations under the housing contract. The houses in Kilgo and part of Crowell are reserved for members of the freshman classes. Each of these units has a resident Head Housemaster and one or more Housemasters. A limited number of Freshmen reside in other houses where they live in community with upperclass students and a Fellow, a Faculty member or an advanced graduate student who serves as their adviser.

Undergraduate Women. All residence houses of the Woman's Col-

lege have both single and double rooms. These houses are alike in their organization. In each of them there is a resident House Counselor, who is a member of the Dean's staff, and full representation from all four classes, with the appropriate number of places reserved each year for freshmen. Young women enrolled in Engineering also live on East Campus.

Graduate Housing. Duke University strives to provide comfortable, attractive living facilities for resident students both married and unmarried.

Men's Graduate Center is available to men enrolled on a full-time basis in the graduate or professional schools. The majority of rooms are occupied by two persons. A limited number of single rooms are available but are generally reserved by students who have been in residence the previous year.

Epworth Inn on the Woman's College Campus and a graduate section of Hanes Annex are available to women enrolled in the graduate and professional schools.

Duke University Apartments are available for full-time graduate and professional students. The 224 units are complete with basic furnishings.

For details concerning living accommodations, see the *Bulletin of Undergraduate Instruction* or the *Bulletin of the Graduate School of Arts and Sciences*.

Dining Facilities

The dining facilities on the West Campus include three cafeterias, with multiple-choice menus, and the Oak Room where full meals and *a la carte* items are served. The dining halls in which all resident women have their meals are located in the Woman's College Union and in Gilbert-Addoms residence hall. Because of the large number served in the dining halls, it is not possible to arrange special diets for individual students. The Men's Graduate Center has a cafeteria open at meal hours, and a coffee lounge open until 11:00 p.m.

Services Available

Medical Care

The Student Health Program is closely related to the Teaching Hospital of the Duke University Medical Center. This arrangement provides an unusually comprehensive service, available at all times. The cost, for regularly enrolled students, is included in the general fee paid each semester and in the fees charged each student in the summer quarter.

For details concerning medical care, see the *Bulletin of Undergraduate Instruction* or the *Bulletin of the Graduate School of Arts and Sciences*.

The Counseling Center

The University maintains a counseling center which provides educational, vocational, and personal counseling for students. The Center is the administrative agency for most of the national testing programs, including admissions tests for graduate and professional schools. A library of information on occupations, graduate training, and fellowships for graduate study is maintained.

The counseling and information services of the Center are free to Duke students. Additional information on the counseling, testing, and information services may be secured from the Duke University Counseling Center, 309 Flowers Building, Duke University, Durham, North Carolina, 27706.

Appointments Office

The appointments office is a service agency designed to aid students and alumni in obtaining both summer and post-college employment. Its primary function is to serve as an intermediary between students, alumni, and prospective employers. It directs attention to possibilities in business and professional fields, it assembles comprehensive records on each registrant and makes these records available to appropriate representatives, and it arranges interviews with prospective employers. The Office initiates contacts for students or cooperates with students who make contacts through personal efforts or through various departments of the University. It aids the registrant in directing his search to a field appropriate to his aptitude, training, and interest.

There are two major divisions of the Office: the Commercial Division, which handles all matters involving contacts with business and professional areas not related to formal education; and the Educational Division, which concerns itself with teaching and school administration positions at all levels. Seniors, graduate students, and alumni may register with either or both of these divisions.

The Office receives more calls for qualified personnel than it can supply from its registrants. It is to the mutual advantage of the students and the Office that a complete record of registrants be assembled by the fall of the senior year or, in the case of graduate students, by the fall preceding the year during which they will seek employment.

Organizations and Activities

Engineers' Student Council

The Engineers' Student Council, composed of approximately 14

members from the various organizations and classes in the engineering student body, coordinates the activities of all student organizations in the College. The Council acts to represent the interests of the students in their relationships with the public, the faculty, and the administration. The Council is responsible for such activities as the Engineers Show, homecoming displays, supervision of the student Lounge, social events, and the Engineers Guidance Council.

Engineering Student Publication

The DukEngineer, official student-published magazine of the College, which appears twice each semester, contains articles on technical and semi-technical topics and other matters of interest in the College.

Engineers' Radio Association

Membership in the Engineers' Radio Association is open to all students of the College who have an interest in amateur radio. The Association operates amateur radio station W4AHY and conducts code and theory classes for members who desire to obtain a Federal Communications Commission license.

General Activities Open to Engineers

As part of the University Community, students in the engineering programs share in all activities open to students.

Student Branches of Engineering Professional Societies

The three Departments of the College support student branches of the following national professional engineering societies: *American Society of Civil Engineers*, *American Society of Mechanical Engineers*, *Institute of Electrical and Electronics Engineers*.

Engineering Guest Lecture Series

In addition to his participation in the student branches of the national professional engineering societies, the student has the opportunity of additional development through the *Engineering Guest Lecture Series*. The general function of the series is to provide stimulating lectures by outstanding members of the engineering profession.

Engineering Honor Societies

Tau Beta Pi. Engineering national honor society—Gamma Chapter of North Carolina.

Chi Epsilon. Civil engineering national honor society—Duke University Chapter.

Eta Kappa Nu. Electrical engineering national honor society—Delta Lambda Chapter.

Pi Tau Sigma. Mechanical engineering national honor society—Pi Iota Chapter.

Order of St. Patrick. Honor society recognizing leadership in engineering student activities.

General Honor Societies

In addition to the national engineering student honor societies, students of the College are eligible for membership in the national and local honor societies throughout the campus.

Engineering Awards and Prizes

The Tau Beta Pi Prize is a prize such as an engineering handbook which the North Carolina Gamma Chapter of Tau Beta Pi, engineering national honor society, awards each year to a sophomore student in engineering for outstanding scholastic achievement during the freshman year.

The American Society of Civil Engineers Prize consists of a Certificate of Award and a one year's payment of dues in the American Society of Civil Engineers. Awards are made annually by the North Carolina Chapter to the two outstanding seniors in civil engineering based on the recommendation of the faculty of the Civil Engineering Department. The basis for selection is the student's scholastic record, his contribution to the Student Chapter, and his participation in other college activities and organizations.

The American Public Works Association Prize consists of a Certificate of Award, one year's payment of dues in the American Public Works Association, and a \$25 cash award made annually by the North Carolina Section to an outstanding senior in Civil Engineering based upon the recommendation of the faculty of the Civil Engineering Department. The basis of selection is the student's scholastic record and his interest in a career in public works.

The George Sherrerd III Memorial Award in Electrical Engineering was established in 1958 by the parents of George Sherrerd III, a graduate of the class of 1955, to recognize outstanding undergraduate scholarship. This award, consisting of the income from a fund of \$5000.00, is made annually to that senior student in Electrical Engineering who, in the opinion of the Electrical Engineering faculty, has attained the highest level scholastic achievement in all subjects and simultaneously has

rendered significant service to the College of Engineering and the University at large. The recipient's name is inscribed on a plaque displayed in the Engineering Building.

The Charles Ernest Seager Memorial Award, established in 1958 by the widow and friends of Charles Ernest Seager, a graduate of the class of 1955, recognizes outstanding achievement in the annual Student Prize Paper Contest of the Duke Branch of the Institute of Electrical and Electronics Engineers. The award consists of inscribing the name of the contest winner on a plaque displayed in the Engineering Building.

The Milmow Prize consists of a certificate of award and a one year's payment of dues in the Institute of Electrical and Electronics Engineers for the membership year in which the honoree is awarded his baccalaureate degree. It is awarded annually to that student from North or South Carolina graduating in the Department of Electrical Engineering who, in the opinion of the faculty of that department and as shown by his grades, has made the most progress in electrical engineering during his last year in college.

The T. C. Heyward Award is given annually to the outstanding Mechanical Engineering Sophomore by Pi Tau Sigma. The award will normally consist of a handbook as well as a small cash award.

The Walter J. Seeley Scholastic Excellence Award is presented annually by the Engineers Student Council, in the name of Dean Emeritus Walter J. Seeley, to that member of the graduating class of the College who has achieved the highest scholastic average in all subjects and who has shown diligence in the pursuit of an engineering education. The recipient of the award is determined by a committee composed of the chairmen of the respective departments, the Assistant Dean of the College of Engineering, and a representative of the Engineers Student Council. This award is initiated in the spirit of academic excellence and professional diligence demonstrated by Dean Seeley. The Council hopes that this award will serve as a symbol of the man and the ideals for which he stands.

Admission

Undergraduate

New students are admitted for the academic year at the opening of school in the fall.

Because enrollment is limited, the Committee on Admissions selects those students who in its judgment are best qualified to benefit from the opportunities which the College offers. Selection is based not only upon academic grades and test scores but also upon recommendations of school officials and other personal criteria.

Requirements

Although there are no inflexible subject matter requirements, at least 15 acceptable units of secondary school credit must be presented. Of these at least 12 must be in college preparatory subjects: English, foreign language, history and social studies, mathematics, and physical or biological sciences. Applicants for the College of Engineering are advised to present four units of mathematics and at least one unit in physics or chemistry.

Students applying for admission are required to take the Scholastic Aptitude Test, the English Composition test, and two other achievement tests of their own choosing given by the College Entrance Examination

Board. Candidates applying to the College of Engineering must include the appropriate mathematics test.

Prospective students are urged to broaden their reading outside of class during their senior year and to make the acquaintance of books and magazines that do not form part of the subject matter of their courses. At the same time, they should take every opportunity to increase their competence in writing. Those who cannot write simple, clear, grammatical English prose will be progressively at a serious disadvantage in the competition for admission and also in the general work of the freshman year. Careful attention to correctness in English in correspondence and on application blanks cannot be too seriously stressed for candidates for admission.

Regular Admission

Candidates for regular admission must apply no later than January 15, and normally do so during the fall of the senior year. For this group, decisions are mailed by April 15.

Application forms and instructions regarding procedure and necessary documents to be included will be sent upon request to the Office of Admissions, Duke University, Durham, North Carolina, 27706. A non-refundable processing fee of \$10.00 must accompany the submission of the full application form.

A candidate for admission who wishes to arrange an interview should do so through the Director of Undergraduate Admissions.

Early Decision Plan

For the well-qualified student who has definitely decided to enter Duke if accepted, the University offers to reserve a place by "early decision" on December 1 of the student's senior year in secondary school. The deadline date for completing applications for Early Decision is November 1. Interested students should write to the Office of Admissions for detailed information.

Admission to Advanced Standing

Admission by transfer from other institutions may be arranged for a limited number of students under certain well-defined regulations. All such candidates must submit official transcripts of all work completed at other colleges, accompanied by a statement of honorable dismissal and scores on the Scholastic Aptitude Test of the College Entrance Examination Board. An overall grade average of at least C must have been earned on work previously completed; courses on which a grade less than C has been earned cannot be accepted for transfer credit. Students may not apply for transfer beyond admission to the junior class. Further detailed

regulations for admission by transfer may be obtained from the Office of Admissions.

A small number of special students of mature age may be admitted for such courses of instruction as their earlier training and experience may qualify them to take. They may not be accepted, however, as candidates for a degree in a regular course unless they are able to meet all normal requirements for admission which apply to all beginning students.

Readmission of Former Students

A student who desires to return, following withdrawal from College, should apply to the Director of Undergraduate Admissions. He will be asked to send a detailed statement of his activities since withdrawal. If practicable, the student should arrange for an interview with the appropriate Dean of the College.

Graduate

Prerequisites

A student seeking admission to the Graduate School of Arts and Sciences of Duke University with a major in engineering must have received a Bachelor's degree from an accredited institution. His undergraduate program should be well rounded and of such quality as to give positive evidence of capacity for graduate study. Normally he should have majored in the area of his intended graduate study. The three Departments of Engineering list specific prerequisites in their respective sections of this Bulletin.

Students Requiring Admission

Admission is required of (1) all students who intend to pursue study toward a degree offered by the Graduate School, (2) all other students who desire credit for whatever purpose for graduate courses—except students who register as Special Students in the Summer Session. Students who have discontinued a program of study after earning a master's degree here must by letter request permission of the Dean of the Graduate School to undertake a doctoral program. Members of the Duke University faculty will be granted only Non-Degree Admission.

Procedure for all Applicants

A student seeking admission to the Graduate School should request the Dean of the Graduate School to send an application blank. This he should

fill out completely and return promptly. In addition he should provide the following supporting documents: (1) a transcript or transcripts of all his undergraduate and graduate work mailed directly by the Registrar to the Dean; (2) as soon as possible, supplementary transcripts showing completion of work in progress when the earlier transcript was made; (3) three letters of recommendation written by persons best qualified to judge him as a prospective graduate student and mailed directly to the Dean; and (4) scores on the Graduate Record Examination and Miller Analogies Test (recommended for all applicants and required of applicants for fellowships or traineeships).

All applicants except foreign students applying from outside the United States and non-degree students must include an application fee of \$5.00 in check or money order payable to Duke University.

Additional Procedure for Foreign Students. Fully qualified students from outside the United States are welcomed in the Graduate School to take courses and in many instances to study toward a degree. In addition to the information required of all students, the foreign student should submit with his application for admission certain special information, as outlined in the *Bulletin of the Graduate School of Arts and Sciences*.

Closing Dates for Applications

Because applications cannot be reviewed until all required supporting documents are filed, applications for admission to the Graduate School of Arts and Sciences should be submitted at least *two weeks* before the closing dates listed below:

Fall semester, admission and award	February 15
Fall semester, admission only	August 1
Spring semester, admission only	January 1
Summer Session,* First Term	May 13
Summer Session,* Second Term	June 21

Notification of Admission

When admission to the Graduate School is approved, the student will receive a letter of admission and an acceptance form. The process of admission is not complete until the statement of acceptance has been returned. (For a more complete discussion of admission status, refer to the *Bulletin of the Graduate School of Arts and Sciences*.)

*Students seeking admission to the Summer Session should make application to the Dean of the Graduate School as well as to the Director of the Summer Session.

Financial Information

Undergraduate Fees and Expenses

Fees paid by the students cover only a part of the cost of their instruction and of the operations of the University. Income from endowment and contributions from the alumni, alumnae, and other public-spirited men and women meet the balance, which constitutes more than half the total cost.

Estimated Expenses for an Academic Year

Certain basic expenditures are to be considered in preparing a student's budget, such as tuition, the general fee, room and board. The necessary expenditures together with a reasonable amount allotted for miscellaneous items such as laundry, organizational dues, and sundry purchases are shown as follows:

	<i>Men</i>	<i>Women</i>
Tuition	\$1,250.00	\$1,250.00
General Fee	187.00	187.00
Room Rent	310.00	335.00
Board	* 550.00	† 500.00
Books and Supplies	70.00	70.00
Miscellaneous Expenses	‡ 443.00	‡ 443.00
Totals	<u>\$2,810.00</u>	<u>\$2,785.00</u>

*Cafeteria estimate. †Board rate. ‡Moderate estimate.

Miscellaneous expenses beyond the moderate estimate given above depend to a large extent upon the tastes and habits of the individual. It is realistic to suggest that the average Duke student, however, can plan on a budget of \$2,800.00 for the academic year. Travel costs, clothing purchases, and other major expenditures would have to be added to this estimate.

Debts

No records are released and no student is considered by the faculty as a candidate for graduation until he has settled with the Bursar for all indebtedness.

Bills may be sent to parents or guardians provided the Bursar has been requested in writing to do so. Failure to pay bills on or before the due dates will debar the student from class attendance until the account is settled in full.

Tuition and Fees

Tuition and General Fee. The tuition of \$625.00 and the general fee of \$93.50 are due and payable not later than the day of registration for a particular semester. After the day of registration no refund of the tuition or the general fee will be made except for involuntary withdrawal to enter the armed services.

Registration Fees and Deposit. New students, on notification of acceptance, are required to pay a non-refundable first registration fee of \$20.00 and to make a deposit of \$50.00. The deposit will not be refunded to accepted applicants who fail to matriculate. For those who do matriculate, \$25.00 of the deposit serves as a continuing room deposit for successive semesters, and the remaining \$25.00 serves as a continuing registration deposit. Arrangements for refund of the \$25.00 room deposit are described in information furnished each resident student by the Housing Bureau.

Readmission. Students who have been readmitted to the University after an absence of one or more semesters, on notification of readmission, are required to make the \$50.00 room and registration deposit.

Late Registration. Students who register in either semester at a date later than that prescribed in the Calendar of the College must pay to the Bursar a fee of \$5.00.

Refunds. The \$25.00 pre-registration deposit will be refunded to students (1) whom the University does not permit to return, (2) who graduate, or (3) who request the refund at the time of pre-registration, thus indicating their intention not to return for the following semester. The pre-registration deposit will not be refunded to students who pre-register and fail to enter the following semester on schedule.

ROTC Deposit. An Air Force ROTC deposit of \$20.00 is required of students enrolling in Air Science to cover possible loss of military equipment issued to them. This deposit is refunded to the student upon return of issued equipment.

Fees for Special Students. In the regular academic year students who register for no more than two courses with a maximum credit of eight semester hours are classified as special students. They are charged a registration fee of \$5.00 for each course and \$42.00 for each semester hour of course credit. Registration for nine or more semester hours, or three or more courses, requires payment of full fees.

Fees for Auditing. Auditing of one or more courses without charge is allowed students paying full fees, provided that the consent of the instructor is obtained. Students who are enrolled for not less than three nor more than eight semester hours may audit other courses by payment of \$21.00 for each course audited.

Fees for Duke Employees. In order to encourage its employees in their professional and personal advancement, Duke University will permit full-time employees who are paid on a monthly basis for two or more years to take one or two courses, but not more than seven semester hours and will charge \$5.00 per course plus \$21.00 per semester hour. Courses may not be audited unless at least one course is taken for credit.

Fees for Transcripts. Requests for transcripts should be directed to the Office of the Registrar. Ten days should be allowed for processing. One transcript is issued free of charge. Additional copies are supplied at \$1.00 each.

Fees for Course Changes. Changes in courses for reasons not arising within the University require a payment of \$1.00 for each change made. No course may be elected later than one week after the opening of the semester, and no student may be admitted to any class without an official enrollment.

Living Expenses

Housing. In the residence houses for undergraduate men, the rental charge for a single room is \$380.00 for the academic year or \$190.00 for each semester; for a double room the charge is \$620.00 for the academic year or \$310.00 for each occupant, or \$155.00 per semester for each occupant. Slightly higher rates will be charged in new dormitories.

In the residential units of the Woman's College the rental charge for a single room is \$405.00 for the academic year or \$202.50 for each semester. The rental charge for a double room is \$670.00 for the academic year or \$335.00 for each occupant, or \$167.50 per semester for each occupant. Detailed information concerning the student's obligations under the housing contract is published in the Woman's College Handbook.

Food Services. The dining facilities on the West Campus include three cafeterias, with multiple-choice menus, and the Oak Room where full meals and *a la carte* items are served. The cost for the academic year ranges from \$550.00 upward depending upon the taste of the individual.

The dining halls in which all resident women have their meals are located in the Woman's College Union and in Gilbert-Addoms residence hall. The charge for board is \$250.00 per semester, payable at the time of registration.

Graduate Fees and Expenses

The following table shows the general fees and charges collected from all graduate students. All fees for each semester are due and payable, unless otherwise specified, at the time of registration for that semester. All fees are subject to change without notice. No student is admitted to classes until arrangements have been made with the Bursar of the University for the settlement of fees.

Tuition and general fees* per semester (40.00 per unit)	\$600.00
Athletic Fee, not including federal tax, optional, per year, payable in the fall semester	15.00
Binding fee, two copies of thesis or dissertation, other copies optional, \$5.00 a copy	10.00
ETS Foreign Language Test, each administration, payable to the University Counseling Center	8.00
<i>In absentia</i> fee, due on date of registration one unit per semester . .	40.00
Late registration fee	5.00
Microfilming fee, doctoral degree only, upon final submission of dissertation	25.00

Housing (See detailed statement, *Bulletin of Graduate School of Arts and Sciences*.)

Tuition and fees for a full semester program of 15 units amount to \$600.00. For a part program, tuition and fees are computed at the rate of \$40.00 per unit.

Undergraduate Financial Aid

Duke University is interested in students with ability and ambition. It is the aim of the University Financial Aid Committee and others affiliated with the Financial Aid Program to provide, insofar as possible, the

*General fees, in lieu of most special charges, include the following fees: Matriculation, Medical, Library, Damage, Commencement, Diploma, and an average of the Laboratory and Material Fees.

financial assistance required by students accepted for entrance who are unable to defray the cost of college from their own resources. The assistance is made available in the form of scholarships, grants-in-aid, loans, and part-time employment.

In 1965-66 financial aid totaled \$1,601,000.00. Of this amount \$944,650.00 was allotted to 1,058 undergraduate students in the form of scholarships, grants-in-aid, and remissions of tuition; \$256,275.00 in student loans, and approximately \$400,000.00 through part-time employment on the campus and in the city of Durham and the surrounding area.

Freshmen students shared proportionately in this aid: 351 received awards totaling \$340,226.00 in direct assistance not including loans or part-time employment. Loans were made to 142 students totaling \$76,675.00 in addition to other assistance received from Duke University.

Scholarships

All undergraduate requests for application forms for scholarships, grants-in-aid, industry scholarships, or remission of tuition should be addressed to the Office of Admissions, Duke University, Durham, North Carolina 27706.

All candidates for scholarships and grants-in-aid must submit an official Application for Admission to the University and the Application for Scholarship to the Office of Admissions. Scholarship candidates who desire to be considered for the maximum value of scholarships on the basis of financial circumstances are required to submit the "Parents' Confidential Statement" of the College Scholarship Service. The "Parents' Confidential Statement" may be obtained from high school principals or upon request from the Admissions Office.

Scholarship candidates should initiate their applications during the fall semester of their senior year of study in secondary schools. Instructions concerning the specific requirements and deadline dates will accompany the application materials sent to applicants for scholarships and grants-in-aid.

Awards annually available to all undergraduate students at Duke University are listed in the *Bulletin of Undergraduate Studies*.

Engineering Scholarships

Engineering Scholarship Fund was established by gifts of various persons, to be used for scholarship aid to engineering students.

Thomas R. Mullen, Jr., Scholastic Fund was established April 5, 1949, by gift of T. R. Mullen in memory of his son, the income to be used for scholarship assistance to students in the College of Engineering. Preference is to be given students who are children of employees of the

Lehigh Structural Steel Company or others nominated by the Company. One award is available each year.

Jones Scholarship Fund was established in 1951 by Edwin L. Jones, Sr., '12; Annabel Lambeth Jones, '12; Edwin L. Jones, Jr., '48; Lucille Finch Jones; and the J. A. Jones Construction Company in memory of James Addison Jones and Raymond A. Jones; a portion of the income to be used for scholarship aid to worthy and qualified students in Civil Engineering.

Alcoa Scholarship in Engineering was established in 1962 by the Alcoa Foundation. One award of \$625.00 per year is made to a student preparing for a career in either electrical or mechanical engineering.

Western Electric Fund Scholarship was established in 1957 by gift of the Western Electric Fund; a scholarship in the amount of \$800.00 is given annually to an outstanding student in the field of electrical engineering who has completed the sophomore year of study.

Union Bag-Camp Corporation Scholarship was established in 1957 by gift of the Union Bag-Camp Corporation to provide a scholarship of \$600.00 to a student in the fields of chemistry or mechanical engineering in alternate years.

Duke University participates in several other industry scholarship programs. Several of these awards for which freshmen may apply are assigned to engineering students annually although they are not restricted to students in this field of study. Among the available awards are the General Motors Scholarships and the Texas Company Scholarships.

Tuition Grants

Tuition grants are available to children of certain qualified staff members of Duke University for a maximum of eight semesters of undergraduate study at Duke.

Loans

Loan funds held in trust by the University as well as funds supplied by the federal government through the National Defense Education Act of 1958 are available to qualified students. Freshmen as well as upperclassmen are eligible to apply for a student loan.

For details concerning loans, see the *Bulletin of Undergraduate Instruction*.

The Student Loan Committee in approving loan applications selects those students who from the standpoint of character, scholastic attainment, personality, and degree of financial need are deserving of this consideration.

Employment Opportunities

The Financial Aid Office maintains an employment office to serve students who need part-time jobs. There are many opportunities both on the campus and in the city of Durham. A considerable number of students each year help defray their college expenses by working.

Those students accepted for admission to the College of Engineering in need of part-time employment should apply to Financial Aid Office, Duke University, Durham, North Carolina 27706. Students in the Woman's College should apply to the Assistant Dean of Undergraduate Women, 108 East Duke Building, Duke University, Durham, North Carolina 27708.

Graduate Financial Aid

Awards through the Graduate School of Arts and Sciences

For the encouragement and financial assistance of graduate students of marked ability, Duke University has established a considerable number of fellowships, scholarships, and assistantships. The stipends for these range from \$600 to \$3,400 for the academic year. Holders of grants pay tuition and other fees regularly required of all graduate students.

Fellows and scholars pay full tuition and fees and are expected to register for a full schedule of course work each semester. In general, assistants register for a four-fifths program and pay 12 units tuition and fees per semester.

Application for these awards, along with all supporting documents, must be submitted on or before February 15. Notification of awards other than assistantships may not be sent before March 21 but will be sent shortly thereafter. Late applications will be considered, should any vacancies occur in the list of appointees. No appointment is made for longer than one academic year.

Further information and application forms may be obtained from the Dean of the Graduate School, Duke University, Durham, N. C., 27706.

Special Fees for Teachers and Others

The Graduate School recognizes a special obligation to encourage the following types of students in their professional and personal advancement: (1) members of the faculties of the neighboring public schools and colleges, currently engaged in *full-time* teaching while taking courses in the Graduate School, (2) ministers of neighboring churches, (3) wives

of Duke faculty members, (4) *full-time* employees of Duke University who are paid on a monthly basis throughout the year.* The reduced fees do not apply to teachers and ministers while on leave of absence, nor to holders of fellowships, scholarships, or graduate and research assistantships, nor to part-time instructors.

Persons eligible for the reduced fee must meet the admission standards required of all graduate students and must be admitted to the Graduate School. They may enroll for one or two courses per semester (in no case totaling more than 7 units) upon the payment of a fee of \$5.00 for registration for each semester and a tuition fee of \$20.00 per unit of credit or an audit fee of \$20.00 per course.

Awards through the College of Engineering

The College of Engineering and its component departments are able to offer appointments as teaching and research assistants to graduate students in engineering. Stipends range up to \$3,400 for the academic year.

Further information concerning these appointments and procedures for making application may be obtained from the Associate Dean for Graduate Study and Research, College of Engineering, Duke University, Durham, N. C., 27706.

Stipends and Income Tax

Ordinarily stipends awarded under fellowships and scholarships are not subject to income tax and Social Security Tax. However, a portion of the award to graduate assistants may be subject to tax. The Graduate Office will supply detailed information.

*Members of the Duke University faculty will be granted only Non-Degree Admission to the Graduate School of Arts and Sciences.



University Registration and Regulations

Undergraduate Registration

Pre-registration

Each new student receives a copy of the *Academic Guide for Freshmen* and the *Bulletin of Undergraduate Instruction* in the summer, and submits a trial course program for his first semester. All other students pre-register for a given semester in the fall or spring of the year on the basis of information and advising available to them. Evidence that the continuing pre-registration deposit of twenty-five dollars has been paid (see page 36 for detailed information) must be submitted at the time of spring pre-registration. A student's tentative course program is filed for permanent record in the Central Records Office after each pre-registration. He may complete his registration by mail. Students who pre-register in either semester at a date later than that specified in the calendar of the colleges are subject to a penalty of \$5.00, payable to the Treasurer. Students who do not pre-register within an allotted time must be readmitted to the college by application to the Director of Admissions.

Semester Opening and Registration

Each pre-registered undergraduate student is required to return to the

University each semester on registration day and to report to his college office by 6 p.m. Ample time should be allowed since failure to report entails loss of the continuing registration deposit and of registration in each class for which one is pre-registered. An official enrollment is required for admission to any class.

After pre-registration course changes may be made on registration day or during the first week of classes. Changes in courses for reasons not arising within the University entail a fee of \$1.00.

Undergraduate Academic Regulations

Course Requirements

During each semester of the regular academic year, the academic program of an undergraduate student normally consists of five or six courses totaling 15-17 semester hours, exclusive of physical education. A maximum program of 19 semester hours exclusive of physical education has also been fixed since the University is committed to quality work and education that is not exclusively course centered. No student is allowed to take fewer than 14 semester hours of work without special permission from the Dean or to take more than the normal load of work unless his average grade in the preceding semester is higher than a C.

Course Audit

With the consent of the instructor a full-time, degree student is allowed to audit one or more courses in addition to the normal program. After the first week of classes in any semester, no student classified as an auditor in a particular course may take the course for credit, and no student taking a particular course for credit may change classification to an auditor. A student may not repeat for credit any course he has previously audited. Auditors submit no daily work, take no examinations, and receive no credit for courses.

Course Changes

New courses may not be elected later than one week after the opening of classes during the semester. Procedures for withdrawal from a course are determined by each of the undergraduate colleges, but in any instance permission of the Dean is required.

Attendance Regulations

The attendance regulations specifically place the responsibility for class attendance upon the individual student. *He is expected to attend classes*

regularly and punctually. A student should recognize that one of the most vital aspects of a residential college experience is attendance in the classroom and that the value of this academic experience cannot be fully measured by testing procedures alone.

The members of the student body are considered sufficiently mature to appreciate the necessity of regular attendance, to accept this personal responsibility, and to demonstrate the kind of self-discipline essential for such performance and, conversely, to recognize and accept the consequences of failure to attend. An instructor is privileged to refer to the Dean for suitable action students who in his opinion are causing their work or that of the class to suffer because of absences or latenesses.

Absences from tests and required classes due to illness will be excused when certified by a proper medical official. Absences due to authorized representation of the University may be excused. Officials in charge of groups representing the University are required to submit names of those persons to be excused to the Dean's office 48 hours in advance of the hour when their absences are to commence.

Regulations for Participation in Athletics and Other Activities

Members of the athletic teams or other students groups engaging in public representation of the University are expected to be carrying their current work satisfactorily. Students may be barred from participation in such representation if, in the opinion the Dean, they fail to meet this requirement.

Grading

Final grades on performance in academic work are sent to students and parents, or guardians, after the examinations at the end of each semester. In addition, six-weeks advisory grade reports for freshmen are mailed each semester. Grade symbols are as follows:

Passing. A, exceptional; B, superior; C, average; and D, low pass.

Failing. A grade of F indicates that the student has failed the course and that to receive credit for the course he must repeat the work in class.

Absence from the final examination. In all cases in which the student is absent from a final examination he receives an X instead of a final grade. If he does not present an acceptable explanation for his absence to the Dean's office within 48 hours after the scheduled time for the examination, the X is converted to an F. A student absent from examination, if the absence has been excused by the Dean, may receive an examination upon payment of a fee of \$5.00 to the Treasurer of the University. The instructor concerned arranges for examination in cases where

absences are excused. An X not cleared by the end of the semester following the examination missed is converted to an F.

Incomplete work. If because of illness or other emergency a student's work in a course is incomplete, he may receive an I for the course instead of a final grade. Incomplete courses must be completed before the close of the succeeding semester; otherwise, the I is converted to an F and the course must be retaken if the student is to receive credit for it. In case a student whose work is incomplete is also absent from the final examination, he receives an X for the course.

Withdrawal. The letter W is used to indicate official withdrawal from a course. If a student drops a course without such permission, a grade of F is recorded for that course. If he drops with permission a course in which he is failing, the grade for that course is recorded as an F unless in the judgment of the Dean circumstances do not require this penalty but permit a notation of a W to indicate official withdrawal.

Credits

The unit of credit used is the semester hour, which signifies one class period a week throughout the semester. Two or three hours of laboratory work are equivalent to one hour of class work.

Seniors who at the beginning of a semester lack no more than nine hours for the fulfillment of the requirement of the requirements for the B.S.E. degree may enroll, with permission of the Dean of the Graduate School, in graduate courses for a maximum total program of 15 semester hours.

Advanced Placement Course Credit

Any student who has earned a score of three or higher on an Advanced Placement examination of the CEEB and is approved for placement in a sophomore-level course or above may be considered for course credit in appropriate subjects. For those presenting scores of four or five the award of credit will be made automatically upon matriculation; for those presenting scores of three it will be determined with the approval of the University department concerned no earlier than at the end of the first semester. Course credit may be granted for one or two semesters in each subject area in which examination is offered in the Advanced Placement Program.

Transfer Credit

Transfer credit is evaluated from regionally accredited, degree-granting institutions. Courses taken away from Duke in which grades of less than C have been earned are not acceptable for transfer credit. Credit for work completed at other institutions will be determined in relation to the

curriculum requirements of the college in which the student enrolls at Duke.

Credit for courses in science or language offered for advanced standing in any of the undergraduate colleges by a transfer student from a junior college will be evaluated by the departments concerned.

The maximum amount of credit acceptable from a junior college is 60 semester hours, exclusive of physical education. No credit is given for work completed by correspondence, and credit for no more than six semester hours is allowed for extension courses.

Residence Requirements

The final four semesters—or equivalent—of work must be earned in residence except in those instances in which a student has been approved to take his junior year abroad. For engineering students, 30 of these 60 semester hours must be from those normally taken in the senior year. Students who meet this requirement but who still lack six to eight semester hours in final fulfillment of requirements may take this work in another institution of approved standing, provided the course is approved by the Chairman of their major department and by the Dean.

Quality Points and Class Standing

An overall indication of the quality of student performance is provided by assigning quality points per semester hour of a course as follows: an A = 4; B = 3; C = 2; D = 1; and F = 0. On the basis of these points there is maintained for students a Duke cumulative average (determined by dividing the number of quality points earned at Duke by the total number of hours carried at Duke—not semester hours passed).

A student in the College of Engineering matriculating after September 1, 1965, must achieve at least the following for continuation from:

The first to the second year	18 s.h. credit and a q.p.r. of 1.30
The second to the third year	46 s.h. credit and a q.p.r. of 1.60
The third to the fourth year	74 s.h. credit and a q.p.r. of 1.70
The fourth to the fifth year (if needed)	102 s.h. credit and a q.p.r. of 1.80

Freshmen must also pass at least six semester hours of work in their first semester, three required courses in the second semester, and 18 semester hours in the first year; all other students must pass at least nine semester hours each semester. Physical education credits are excluded in each case.

To rank as *sophomores*, students must have to their credit at least 24 semester hours and must have passed certain specially designated courses of the freshman curriculum; as *juniors*, at least 60 semester hours and must have passed certain specially designated courses of the sophomore cur-

riculum; and as *seniors*, at least 96 semester hours and must have passed certain specially designated courses of the junior curriculum.

Requirements for Graduation. For graduation from the College of Engineering, in addition to completion of an approved curriculum, a student matriculating after September 1, 1965, must meet at least the following minimum requirements: the completion of 134 semester hours; a cumulative q.p.r. of 1.90; and a q.p.r. of 2.0 in all work, as well as in all engineering work, taken after having attained senior standing.

Commencement

Degrees are awarded in June at commencement to those who have completed requirements at the end of either regular semester of the academic year. They are awarded at the end of the summer to students who complete degree requirements in a summer session.

Eligibility for Undergraduate Academic Honors

Dean's List

In recognition of academic achievement, students who earn an average quality point ratio of 3.0 or higher on a semester's work of not less than the minimum academic load are placed on the Dean's List.

Class Scholars

The five students in each combined undergraduate class of the University (including Trinity College, The Woman's College, and the College of Engineering) who achieve the highest quality point ratio on at least a normal course load for each academic year shall be designated Class Scholars.

Class Honors

To be eligible for Class Honors a student must earn, during the year, credit for at least the minimum academic load permitted by the college in which he is registered. Students in the freshman, sophomore, and junior classes who earn a 3.50 quality point ratio on all work for the year are eligible for Class Honors.

Graduation Honors

To be eligible for consideration for Graduation Honors a student must have completed in residence a minimum of ninety semester hours. Stu-

dents who earn an average of at least a quality point ratio of 3.50 are recommended for a degree *magna cum laude*. Those who earn a quality point ratio of 3.75 are recommended for a degree *summa cum laude*.

Graduation with Departmental Distinction

Graduation with Distinction in Civil, Electrical, or Mechanical Engineering is awarded to the student who, in the opinion of the department and of a special committee of the faculty, has demonstrated exceptional achievement in the area of his special interest.

Honors-Masters Program

(See *Bulletin of Undergraduate Instruction* for description.)

Distinguished Professor Seminars

(See *Bulletin of Undergraduate Instruction* for description.)

Graduate Registration

The requirements regarding who must register are as follows: (1) All students who enter course work or residence for credit; (2) all students who have completed minimum requirements for an advanced degree, but continue to use the facilities of the University in their research; (3) all students in the *absentia* status; and (4) all students who wish merely to audit a course or courses.

Registration

After the applicant has received notification of his admission to the Graduate School of Arts and Sciences and has returned his statement of acceptance of admission, he may present himself for registration. During the registration periods, announced in the *Bulletin*, he first confers with the Director of Graduate Studies of his major department, who prepares and signs a course card, listing the course work to be taken during the semester. The student then presents this course card to registration officials, who enroll him officially in his courses. After his first registration period as a current student he will pre-register at the stated times for pre-registration. Failure to pre-register incurs the penalty for late registration. Former students who intend to register to resume a degree program must give the Department and the Dean notice of this intention two months before registration.

Late Registration

All students are expected to register or pre-register at the times stated in the Bulletin. Those registering late are subject to a late registration fee of \$5.00.

Change of Registration

During the academic year within a period of fourteen days from the registration date students may change registration with the approval of the Director of Graduate Studies, if no reduction of fee is involved, and with the approval of the Dean if reduction of fee is involved. Thereafter during the first thirty days from the registration date the only permissible change is dropping course-seminar registration and adding equivalent units of research, with the approval of the Director of Graduate Studies, the instructor of the course, and the Dean of the Graduate School of Arts and Sciences.

Normal Registration

A graduate student is designated as fully registered when he registers for the maximum credit his program requires. Required registration is set in consideration of the student's obligation to teach or assist and the stage he has reached in completion of degree requirements. In the *academic year* normal registration for the resident student who does not hold an appointment as a part-time instructor or assistant or does not engage in part-time work is 15 units a semester or 30 units an academic year. The normal registration for the student who holds such an appointment or undertakes such work is either 12 units or a minimum of 9, depending upon the number of hours a week he is required to devote to such duties.

The resident student in a terminal master's program carries a normal registration until he has met all requirements except for submitting his thesis. Thereafter, until submission of the thesis, he registers for 3 units a semester while in residence or, if he elects to go out of residence, for 1 unit *in absentia* each semester until the thesis is accepted.

The resident student engaged in a master's program which is not terminal but preparatory to a doctoral program registers as though he were a doctoral student.

The resident student in a doctoral program carries normal registration through the semester in which he passes the preliminary examination. If he remains in residence, he continues to register for a minimum of 3 units a semester until the dissertation is accepted. If, before or after passing the preliminary examination, he elects to go out of residence, he registers for 1 unit a semester *in absentia* in order to keep his program active.

It is necessary to be a fully registered student according to the regula-

tions listed above (except when registered in absentia) in order to establish eligibility for library carrel and laboratory space, for student housing, for University and some outside loans, for Student Health service including the voluntary Walker plan coverage, and for reporting status for military duty.

The registration of 1 unit a semester in absentia provides occasional consultation with the thesis or dissertation supervisor. It may be waived for military duty or serious problems of health.

In the Summer Session 6 units a term is maximum registration. Students resident in the academic year who wish to continue study and use of University facilities including Summer Session Student Health during the summer must register for 1 unit in the first Summer Session term. This registration provides use of these facilities for both terms.

Regulations Governing Graduate Degrees

Work in the College of Engineering toward the degree of Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) is taken subject to the regulations of the Graduate School of Arts and Sciences, as well as those of the College of Engineering.

The Master of Science

Prerequisites

The degree of Master of Science is offered with a major in the fields of civil, electrical, and mechanical engineering. As prerequisites to this degree the student must have earned from an accredited college the Bachelor of Science in Engineering degree, or its equivalent, and completed a minimum of 12 semester hours work in the major field.

Residence Requirements

Candidates for the Master of Science degree must spend, as a minimum, one full academic year, or its equivalent as defined by the Graduate School of Arts and Sciences, in residence at Duke University. If after completion of the 30-unit requirement the candidate remains in residence, he must register for a minimum of 3 units per semester.

A Master's candidate who in the academic year presents a thesis when not registered in residence will be charged 1 unit of residence for the semester in which the thesis is presented. (For regulations governing work taken or requirements completed during the Summer Session see the *Summer Session Bulletin*.)

Foreign Language

There is no foreign language requirement for this degree.

Major and Minor Subjects

The work for the Master of Science degree is designed to provide a broad foundation at the graduate level in the fields of civil, electrical, and mechanical engineering. The student must present acceptable grades for a minimum of 24 units of graduate courses: at least 12 in course work in his major area of concentration in engineering (not necessarily confined to the offerings of the engineering department in which the student is registered); a minimum of 6 units in a minor subject outside of engineering which lends broad support to his program (usually in the mathematical or natural sciences); and the remaining 6 of the 24-unit course requirement in either the major or minor subject, or in an area approved by the major department and by the Dean of Engineering. In addition to the 24-unit course requirement, the student must present a thesis, which carries a credit of 6 units. Thus his earned credit for the degree totals a minimum of 30 units.

Candidacy for the Master of Science Degree

To be considered as a candidate for the Master of Science degree, the graduate student must (1) have made passing grades in all courses taken during the first period of residence (if he registers for fewer than 12 units of graduate courses during his first period of residence, he must make passing grades on the first 12 units of graduate courses), (2) have made a grade of G or E on at least 3 units of this work, and (3) have received the approval of the major department.

Time Limits for Completion of the Master of Science Degree

The candidate for the Master of Science degree who is in residence for consecutive academic years should complete all requirements for the degree within two calendar years from the date of his first registration in the Graduate School. Any candidate must complete all requirements within six calendar years of his first registration.

The Thesis

The thesis should demonstrate the student's ability to collect, arrange, interpret, and report pertinent material on his special research problem.

Filing the Thesis Title. At least one month before presenting the thesis, that is *on or before March 1 for a June degree* or *on or before July 1 for a September degree*, the student must file with the Dean of the Graduate

School, on the official form, the title of the thesis and declaration of intention to graduate. The title must have the approval of the Director of Graduate Studies in the major department, and of the thesis supervisor.

Preparing the Thesis. All basic requirements for preparing the thesis are described in the Manual of Style for Theses and Dissertations, revised 1961, obtained at the Duke University Book Store, West Campus. The quality of paper, form, and binding are prescribed in the Manual.

Submitting the Thesis. Four typewritten copies of the thesis bound in snap binders supplied by the Library must be submitted in approved form to the Dean of the Graduate School on or before May 1 for a June degree or August 15 for a September degree and at least three days before the scheduled date of the student's examination. The copies will then be distributed to the several members of the examining committee. Two copies for the Library will be bound by the Ruzicka Bindery, fee \$5.00 a volume. The student will state whether or not he wishes more than two so bound.

The Examining Committee and the Examination

The instructor who directs the thesis appoints an examining committee composed of the supervisor of the thesis and two other members of the Graduate Faculty, one of whom must be from a department other than that of the major. If the student has been permitted to take related work within the major department, the third member may represent the minor field within the department. This committee is submitted for approval to the Dean of the Graduate School when the thesis is first presented.

The candidate appears before this committee for an examination which lasts for about one and one-half hours. The subject matter covered in the examination is usually restricted to the thesis and to the major field.

If the candidate passes his examination, the examining committee certifies this fact by signing the title page of all copies of the thesis. The candidate then returns the original, the first carbon copy of the thesis, and any others he wishes bound by Ruzicka, to the Dean of the Graduate School, who deposits them in the University Library.

The Doctor of Philosophy

The degree of Doctor of Philosophy is offered in the fields of civil and electrical engineering. It is essentially a research degree. Although course work is a necessary part of the student's program, the mere accumulation of course credits will not be sufficient for attaining this degree. The granting of the Ph.D. is based primarily upon the student's knowledge of a specialized field of study and upon the production of an acceptable dissertation embodying the results of original research.

Requirements for the Ph.D. Degree

The formal requirements, discussed in detail below, for the Ph.D. degree are as follows: (1) foreign language; (2) major and minor courses; (3) supervisory committee for program of study; (4) residence; (5) preliminary examination; (6) dissertation; (7) final examination. In order to be considered for candidacy for the Ph.D. degree, the student must have passed all of his course work in the first year of graduate study; on at least 9 units of course work he must have made a grade of G or better.

Foreign Languages. A reading knowledge of two acceptable foreign languages is required (normally two of the following: French, German, or Russian). A student working toward the doctoral degree should complete the language requirements for that degree at the earliest possible date.

Special courses designed to assist graduate students in acquiring a reading knowledge of French or German are offered for three hours a week, French during the fall semester, German during the spring semester and the Summer Session. A student who registers for either course must reduce his normal load of graduate courses by three units, with no reduction in fees. *No auditors* are permitted in these courses at any time.

Major and Minor Subjects. The student must present acceptable grades for a minimum of 48 units of graduate courses: at least 24 in course work in his major area of concentration in engineering (not necessarily confined to the offerings of the engineering department in which the student is registered); a minimum of 12 units in a minor subject outside of engineering which lends broad support to his program (usually in the mathematical or natural sciences); and the remaining 12 of the 48-unit course requirement in either the major or minor subject, or in an area approved by the major department and by the Dean of the College of Engineering.

Residence. For students who first registered in September, 1959, or thereafter, the minimum registration requirement is 60 units of graduate credit not more than 30 units of which may be accepted by transfer. Since a full program is 30 units per academic year, the prospective Ph.D. candidate who enters with the B.S. degree must plan to spend in residence a minimum of two academic years; if he enters with the M.S. degree, his minimum residence is one academic year. If there are undergraduate deficiencies in his program, he may in addition to the minimum requirements be required to take preliminary undergraduate courses for which he will not receive graduate credit. Even if there are no such undergraduate deficiencies, the student's supervisory committee will determine what requirements, if any, above the minimum the student must meet.

For requirement of registration see Normal Registration, page 50.

Committee to Supervise the Program of Study

The Director of Graduate Studies of the major department will, during the first period of full-time registration of each doctoral aspirant, appoint a program advisory committee consisting of three members of the Graduate faculty in areas relevant to the student's intended major. This committee will guide the student in the initial stages of his program.

Not later than two months before the preliminary examination the Director of Graduate Studies in the major department will nominate for approval of the Dean of the Graduate School of Arts and Sciences a supervisory committee of five, one being designated as chairman. This committee will include at least three members of the major department and one from the minor. This committee will draw up a program of study and administer the preliminary examination and, with such necessary changes as are approved, the final doctoral examination. The final examination may be administered with a minimum of four members.

When the preliminary examination is arranged, the committee and the Director will submit to the Dean of the Graduate School the student's program of study bearing a statement that the Department's course and language requirements have been or are being completed.

Time Limitations

1. At the time that the preliminary examination is passed any courses, language certifications, or other credits for advanced standing which are more than six calendar years old will not be accepted toward fulfilling the minimum requirements of the doctoral degree.

2. The student should normally pass the preliminary examination by the end of his second year of graduate study. If he has not passed it by the middle of the third year, he must file with the Dean of the Graduate School a statement explaining the delay and setting a date for the examination. Except under unusual circumstances, extension will not be granted beyond the end of the third year.

3. The doctoral dissertation should be submitted and accepted within two calendar years after the preliminary examination is passed. Should the dissertation not be submitted and accepted within four years after the examination, the candidate, with the approval of his committee, may petition the Dean of the Graduate School for an extension of one year. Should this extension be granted and the dissertation not be submitted and accepted within the year, the student to remain a candidate for the degree must pass a second preliminary examination. In such a case, the time limit for submitting the dissertation will be determined by the Dean of the Graduate School and the candidate's committee.

Credit for Summer Work

Credit earned in the Summer Session will not reduce the minimum required residence (see above, p. 51).

Preliminary Examination

A student is not accepted as a candidate for the Ph.D. degree until he has passed the preliminary examination. A transfer student who may have passed a preliminary examination elsewhere must nevertheless take the examination in this Graduate School. The examination ordinarily covers both the major and minor fields. The preliminary examination for a student majoring in engineering must contain an oral component of approximately two hours' duration and may, at the discretion of the committee, include a written component.

In the summer, a preliminary examination may be scheduled only between the opening and closing dates of the Summer Session.

Privilege of Re-Examination. Should the student fail the preliminary examination, he may apply, with the consent of his supervisory committee and of the Dean of the Graduate School, for the privilege of a second examination to be taken no sooner than three months after the date of the first. Failure on the second examination will render the student ineligible to continue his program for the Ph.D. degree at Duke University.

The Dissertation

The dissertation is expected to be a mature and competent piece of writing, embodying the results of significant and original research.

Filing Title. Not later than March 1 (March 2 if March 1 falls on Sunday) preceding the June commencement at which the degree is expected to be conferred, the student must file with the Dean of the Graduate School, on the official form to be obtained from the Graduate Office, the title of the dissertation. This title must receive the written approval of both the Director of Graduate Studies of the student's major department and the professor who directs the dissertation.

Form. The basic requirements for preparing the dissertation such as quality of paper, form, and binding are prescribed in the instructions for microfilming (see below) and in the Manual of Style for Theses and Dissertations, revised 1961, to be obtained from the Duke University Book Store, West Campus.

Submitting Dissertation. The dissertation must be completed to the satisfaction of the instructor who directs it. Four typewritten copies bound in snap binders obtained in the Library must be deposited with the Dean of the Graduate School on or before April 15 preceding the June commencement when the degree is to be conferred. The dissertation must

be submitted to the Graduate Office at least seven days before the scheduled date of the student's examination.

Publication on Microfilm. All doctoral dissertations will normally be published on microfilm through University Microfilms, Ann Arbor, Michigan. Authors may, if they wish, also copyright them. The abstract will be published in Dissertation Abstracts. Before final typing is completed, the candidate should obtain in the Graduate Office detailed instructions on the procedure and the microfilming agreement.

In brief, all copies of the dissertation, the original in clean type, will remain unbound except for spring binders. Ten copies of an abstract carefully written and not more than 600 words long, are submitted when the dissertation is first presented to the Graduate Office. A nonreturnable dissertation fee of \$25 is charged for handling and microfilming. If copyright is desired, an additional fee is charged of \$6 plus 2-½ cents per page. The original copy and first carbon copy will be bound by the Ruzicka Bindery. The fee is \$5.00 a volume. The student may request that more than the two copies be so bound.

Final Examination

The final oral examination shall be primarily on the dissertation. Questions may, however, be asked in the candidate's major field. Except in unusual circumstances approved by the Dean a final examination will not be scheduled between the last day of the spring examination period and registration day in the fall semester.

If a student fails his final examination, he may be allowed to take it for a second time, but not sooner than six months from the date of his first. Permission to take the second examination must be obtained from the instructor who directed the dissertation and from the Dean of the Graduate School. Failure to pass the second examination renders the student ineligible to continue work for the Ph.D. degree at Duke University.

Deposit of the Dissertation. After the examination has been passed, the candidate brings to the Graduate Office the original and first carbon copies of the dissertation, properly signed, and any other copies he wishes bound by Ruzicka. At this time he signs the microfilming agreement and pays such binding and copyright fees as are due.

Graduate Academic Regulations

Grades, Hours, and Credits

Although ideally graduate study is principally individual reading, research, and laboratory experimentation under guidance, academic

progress in the United States is generally measured and recorded in terms of course hours and credits. The term *residence* designates full-time study and research in close proximity to facilities provided for both as opposed to part-time study incidental to a full-time occupation. Here required residence of one year is defined as two successive academic semesters of not less than nine units registration each semester. Credit for courses and seminars, research, and residence, and corresponding tuition and fees are stated in terms of units. According to conventional measurement one unit is equivalent to one semester hour.

Credits Earned Outside this Graduate School

Graduate Credit Earned before the B.S.E. Degree is Granted. Ordinarily no credit will be allowed for graduate courses earned before a student has been awarded his B.S.E. degree. However, an undergraduate student at Duke University who, at the beginning of his final semester, lacks no more than 9 semester hours of fulfilling the requirements for the B.S.E. degree, may obtain permission from the Dean of the Graduate School to enroll for graduate courses sufficient to bring his total program to fifteen hours a week. Such graduate courses will be credited toward the M.S. degree, provided that the student meets the requirements for admission to the Graduate School, and that he is duly registered in the Graduate School at the beginning of the final semester.

Duke undergraduates in the Honors-Masters program provisionally may be granted this type of admission at the beginning of their seventh semester provided that at the beginning of their final semester they will meet the requirement stated above.

Under certain circumstances a maximum credit of 6 units may be allowed toward the M.S. degree for graduate courses completed elsewhere. The acceptance of credit up to this amount, however, will not reduce the minimum of required registration at Duke University. (See below.) With the approval of both the student's major department and the Dean of the Graduate School, a student who is granted such transfer credit may be permitted to register for as much as 12 units of thesis research instead of the usual 6 units. Or he may be permitted to fill out his schedule with as much as 6 units of further undergraduate training or 6 units of required language courses on the undergraduate level. In no case will credit be allowed for extension or correspondence courses.

Under appropriate circumstances up to 30 units of graduate credit may be accepted toward the Ph.D. degree for students entering with the M.S. degree from another institution.

Transfer of Graduate Credits. Credit for graduate course work earned at another institution will be determined only after a student has spent one semester at Duke University. After completing his first semester, the

student through his Director of Graduate Studies should file a request that his credits be reviewed and a decision be made.

Reciprocal Agreement with the Consolidated University of North Carolina. Under a plan of cooperation between the University of North Carolina and Duke University, students regularly enrolled in the Graduate Schools of the University during the regular academic year, and paying full fees to that institution, may be admitted to a maximum of two courses per semester in the Graduate School of Duke University upon payment of a nominal registration fee of two dollars and of any other special fees regularly required of all students. Under the same arrangements, students in the Graduate School of Duke University may be admitted to course work at the University of North Carolina. A similar arrangement is effective in the Summer Session. (See the *Summer Session Bulletin*.)

Grades

Grades in the Graduate School are as follows: E, G, S, F, and I. E (exceptional) is the highest mark. G (good) and S (satisfactory) are the remaining passing marks. F (failing) is below passing, and I (incomplete) indicates that some portion of the student's work is lacking, for an acceptable reason, at the time the grades are reported. The instructor who gives an I for a course specifies the date by which the student must have made up the deficiency, in no case more than one calendar year from the date the course ended. If the course is not completed, the grade of F is entered upon the student's record unless his appeal to the Dean for the grade No Credit is approved. The grade of Z indicates satisfactory progress at the end of the first semester of a two-semester course. It will be changed to whatever grade is appropriate upon the completion of the course. A grade of F in a major course normally occasions withdrawal from a degree program not later than the end of the ensuing semester or term; a grade of F in a minor course occasions academic probation.

Courses Primarily for Undergraduates

Students granted provisional admission and others whose preparation is found deficient may on occasion be required as part of their program to take undergraduate courses as prerequisites to continued graduate study. Undergraduate courses thus taken and others elected by the student will carry no graduate credit.

In exceptional cases, 100-level courses outside the major department may be taken for graduate credit to a maximum of two one-semester courses or one year-course not exceeding a total of 8 units, when approved by the Directors of Graduate Studies in the major department and in the department in which the course is listed and by the supervisor of the program.

Withdrawal and Interruption of Program

From a Course. For permissible changes during the first thirty days after the registration date, see Change of Registration, page 44. If a course is dropped without the necessary approval, the permanent record will list the course as Dropped Unofficially, F. If a course is dropped after the thirty-day period, the status of the student at the time of withdrawal from the course will be determined and be indicated on the permanent record as Withdrew Passing (W.P.) or Withdrew Failing (W.F.).

From the Graduate School. The University reserves the right, and matriculation by the student is a concession of this right, to request the withdrawal of any student whose conduct at any time is not satisfactory to the University, even though no specific charge be made against the student. If a student wishes for any reason to withdraw from the Graduate School, he should notify both the Director of Graduate Studies in his major department and the Dean of the Graduate School prior to the date of his expected withdrawal. (For refunds upon withdrawal, see above, p. 50.) For withdrawal occasioned by academic failure, see above.

Students who find it necessary to interrupt their program of study for a period longer than a summer vacation should, before departure, leave with the Graduate Office a statement of the reason for interruption, mailing address, and expected date of return. If they are subject to registration in absentia, they should arrange for such registration before departure.

A foreign student who after successfully completing a minimum of one semester's graduate study must withdraw for the purpose of returning home before the completion of a graduate program may with the approval of his major department request the Dean to issue him a Certificate of Graduate Study.

Transcript

A student who wishes to transfer his credits from Duke University to another institution is entitled to one free transcript of his record. A fee of one dollar, payable in advance, is charged for each additional copy. Requests are directed to the Central Records Office.

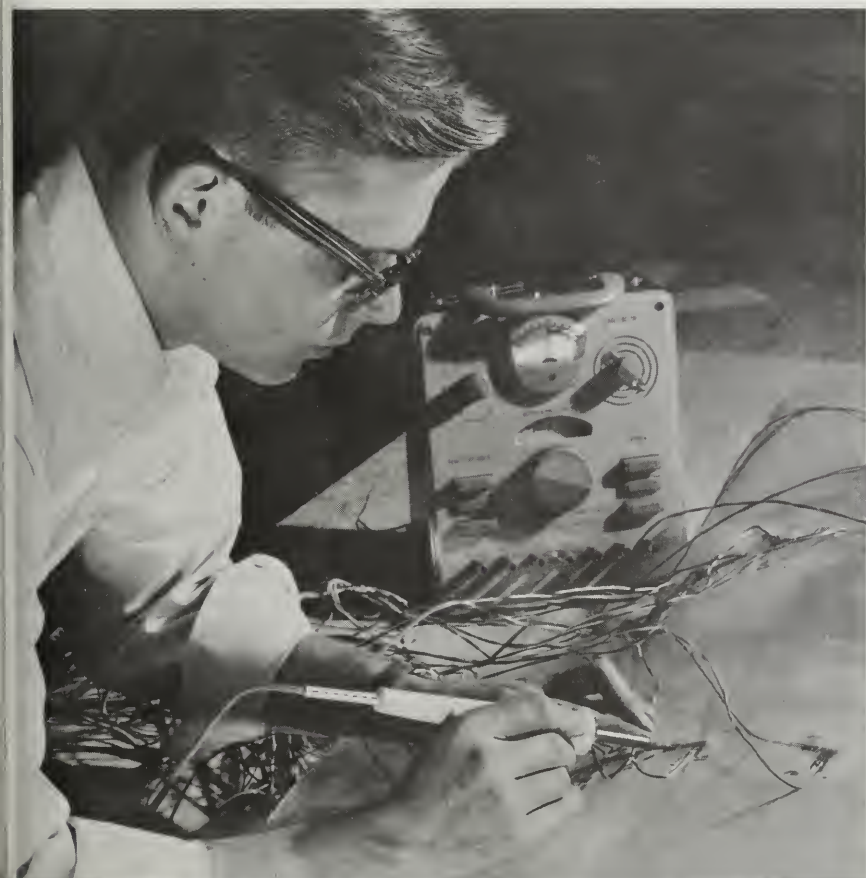
Undergraduate Nonacademic Regulations

Conduct and Discipline

The University expects of its students loyal and hearty cooperation in developing and maintaining high standards of conduct as well as of

scholarship. General University regulations concerning conduct of students are made available to students when admission is offered, or upon request. The student in accepting admission indicates his willingness to subscribe to those regulations. The University reserves the right, and matriculation by the student is a concession of this right, to ask the withdrawal of any student whose conduct at any time is not satisfactory to the University, even though no specific charge may be made against the student.

General oversight of the conduct of students and the administering of discipline are under the supervision of appropriate deans. Immediate supervision is entrusted to the Dean of Men and the Dean of Women. However, through the expressed willingness of the students of the University to assume the responsibility of maintaining high standards of morality, the student body has become to a great degree self-governing. Two councils, one of men and the other of women, each composed of duly elected representatives of the student body, exercise the authority granted the students by their respective colleges to investigate all cases of misconduct, as well as all other cases of violation of proper standards and traditions, and to make recommendations of penalties based on their finding. They exert a guiding and stimulating influence for the promotion of high ideals of conduct among students.



Courses of Instruction

Undergraduate Engineering Non-Departmental Courses

Dean Meriam; Assistant Dean Kraybill

Engrg 1. *Engineering Design I.* Introduction to the "engineering process" through solving problems of engineering design. Problems are posed so that the student will gain some experience in utilizing his knowledge to devise logical solutions. Elements of engineering graphics are included as a means of visualizing and communicating engineering problem solutions. 2 s.h. *Bock, Hill, Lewis, and Sheppard*

Engrg 2. *Engineering Design II.* Continuation of engineering design, the problems being larger in scope than those of the first semester, involving larger design teams, the supposition of more realistic budgets, and closer attention to ultimate feasibility. Principles of orthographic projection applied to graphics problems involving intersections and development of surfaces and the relationship of lines and planes; charts, graphs, graphical calculus. Introduction to use of digital computer in engineering design. 2 s.h. *Bock, Hill, Lewis, Sheppard, and Wells*

Engrg 23. *Statics.* Analysis of force systems and their equilibrium as applied to engineering systems; algebraic methods used with vector notation where appropriate. Principle of virtual work, stability of equilibrium; friction; distributed force systems; equilibrium of differential elements. Corequisite: Math 22. 3 s.h.

Engrg 53. *Engineering Design III.* An introduction to the theory and

techniques of measurement with emphasis on the design of measurement systems: the nature of experimental error, interpretation of experimental data, and error analysis. Laboratory with design and execution of selected measurement problems. Prerequisite: Math 22. 2 s.h.

Engrg 57. Statics. A study of force systems equilibrium by algebraic and graphic methods, friction, centroids, moments of inertia. Prerequisite: Engrg 1. Concurrent: Phys 41 and Math 63. 3 s.h. (Not offered after 1965-66) *Arges, Bock, Harrawood, and Holland*

Engrg 60. Engineering Mechanics. A study of statics and dynamics, as applied to particles and rigid bodies. Fundamentals are developed using vector and scalar values. Concurrent: Phys 41 and Math 63. 4 s.h. (Not offered after 1965-66) *Barton, Holland, Nash, and Wood*

Engrg 63. Introductory Electric Systems I. Complete analysis (transient and steady state) by transform methods of linear lumped parameter networks. Primary emphasis on electric networks but mechanical and electro-mechanical networks included. Application of modern analysis techniques to present day electrical engineering systems that are of concern to all engineers, e.g., amplifiers and transducers. Laboratory included. Corequisites: Math 63 and Phys 41. 4 s.h.

Engrg 73. Mechanics of Deformable Bodies. Stresses and strains in deformable bodies; mechanical behavior of materials and relation of stress to strain; applications of principles to static problems of beams, torsion members, columns, elementary shells; introduction to energy principles, applications. Selected laboratory work. Prerequisite: Engrg 23. 3 s.h.

Engrg 83. The Structure and Properties of Solids. An introduction to materials science and engineering, emphasizing the relationships between the structure of a solid and its properties. The atomic and molecular origins of electrical, mechanical and chemical properties are treated in detail for metals, alloys, polymers, ceramics, glasses and composite materials. Prerequisite: Chem 2. Corequisites: Math 63 and Engineering 73. 3 s.h. *Pearsall*

Engrg 101. Thermodynamics. A basic study of the laws of thermodynamics and their use in engineering analysis and design. The study of the thermodynamic properties of substances is included. Prerequisites: Chem 2 and Phys 42. 3 s.h.

Engrg 107. Mechanics of Materials. Stresses and strains in elastic bodies; shear and moment diagrams; stresses in beams; beam deflections by double integration and area-moments; statically indeterminate beams, torsion, principal stresses. Prerequisite: Engrg 57 or Engrg 60. Concurrent: Math 64. 3 s.h. (Not offered after 1965-66) *Arges and Palmer*

Engrg 109. Mechanics of Materials Laboratory. Study and use of testing machines and strain gages; tests to determine significant mechanical properties of common engineering materials; experimental verification of the elementary theory of structural members. Concurrent: Engrg 107. 1 s.h. (Not offered after 1965-66) *Barton and Sheppard*

Engrg 113. *Introductory Electric Systems II.* A continuation of Engrg 63. Selected laboratory work. 3 s.h.

Engrg 115. *Dynamics.* General principles of dynamics as applied to particles and rigid bodies. Translation, rotation, general plane motion, work and energy, impulse and momentum, gyroscopic motion. Prerequisite: Engrg 57. Concurrent: Math 64. 3 s.h. (Not offered after 1966-67) *Arges*

Engrg 123. *Dynamics.* General principles of dynamics of engineering systems. Kinematics of motion; dynamics of particles, systems of particles, rigid bodies. Impulse-momentum and work-energy principles. Introduction to advanced methods in dynamics; Lagrange's equation. Prerequisites: Engrg 23 and Phys 41. Corequisite: Math 64. 3 s.h.

Engrg 128. *Fluid Mechanics.* Physical properties of fluids, fluids statics, continuity and energy principles, pressure-momentum principle, elementary principles of turbines and pumps, flow of a real fluid, dimensional analysis and dynamic similarity, fluid flow in closed conduits and in open channels; fluid measurements. Concurrent: Engrg 60 or 115. Prerequisite: Math 64. 3 s.h. (Not offered after 1966-67) *Harrawood*

Engrg 133. *Heat Transfer.* An introduction to the concepts of conduction, convection and radiation. A study of temperature gradients, steady and transient heat flow by analytical, graphical, numerical and analogical methods. Selected laboratory work. Corequisites: Engrg 101 and Math 64. 2 s.h.

Engrg 143. *Fluid Mechanics.* Physical properties of fluids; fluid flow concepts and basic equations; continuity, energy and momentum principles; dimensional analysis and dynamic similitude; viscous effects; applications, emphasizing one-dimensional flow theory for incompressible, real fluids. Selected laboratory work. Corequisites: Engrg 123 and Math 64. 2 s.h.

Engrg 163. *Fields.* Treatment of selected topics in field theory of interest to engineers. Basic field concepts, the Laplacian, field sources, waves, diffusion, continuum concepts, the wave nature of elementary particles. The common structure of field theory is applied to selected topics such as thermal conduction, fluid fields, stress-strain in elastic solids, electric and magnetic fields, and electromagnetic fields. Selected laboratory work. Corequisites: Math 111; Engrg 113, 123, 133, and 143. 3 s.h.

Electives

Engrg 169.* *Legal Aspects of Engineering.* A course designed to introduce engineering students to those aspects of the law encountered in the practice of engineering. Subjects included are: contracts and specifications, real and personal property, torts, insurance, agency, equity, evi-

*Offered only upon sufficient demand; enrollment limited.

dence, labor management, sales, expert testimony, engineering registration and ethics. Open to seniors only. 3 s.h. *Ross*

Engrg 170.* *Patent Law for Engineers.* A course designed to familiarize engineering students with the legal principles and procedures for protecting patentable inventions, such as drafting and analysis of specifications and claims, study of infringements, assignments, licenses, and record documentation. Open to seniors only. 3 s.h. *Olive*

Civil Engineering

Undergraduate Courses

Professor Brown, *Chairman*; Professor Bryan, *Director of Undergraduate Studies*

CE 61. *Plane Surveying.* Use and adjustment of instruments; transit-tape, stadia, and plane table surveying; differential and profile leveling; calculation of bearings, latitudes, departures, and areas; accuracy and errors; topographic mapping; rural and urban land survey; celestial observations for azimuth; triangulation; introduction to photogrammetry. Prerequisites: Engrg 1 and Math 21. 5 s.h. (Not offered after 1965-66.) *Sheppard*

CE 72. *Materials Laboratory.* Blending of granular materials and determination of their physical properties, design of concrete and bituminous mixtures, consistency limits of soils. 1 s.h. (Not offered after 1965-66.) *Holland*

CE 96. *Geodetic and Location Measurements.* The theory of measurements and errors associated with controlling and locating systems of constructed facilities; modern field methods and equipment. Laboratory included. Prerequisite: Engrg 53. 3 s.h.

CE 101. *Soil Mechanics Laboratory.* Soil exploration and sampling. Laboratory determination of index properties: water content, void ratio, particle size, Atterberg limits. Consolidation testing. Triaxial shear testing. Classification and identification of soils. Compaction testing. Demonstrations of seepage, bearing capacity and earth pressure phenomena. Concurrent: CE 135. 1 s.h. (Not offered after 1967-68.) *Holland and Vesic*

CE 110.* *Plane Surveying.* Use and adjustment of instruments; transit-tape, and stadia surveying; differential and profile leveling; calculation of bearings, latitudes, departures, and areas; accuracy and errors; topographic mapping. Prerequisites: Engrg 1 and Math 21. 3 s.h. *Arges*

CE 113. *Route Surveying.* Simple, compound and reverse curves; spirals; earthwork and grading plans. Prerequisite: CE 61. 2 s.h. (Not offered after 1966-67.) *Sheppard*

*Offered only upon sufficient demand; enrollment limited.

CE 116. *Transportation Engineering.* History of transportation problems; highway, air, pipeline, mass and rapid means of transporting people and materials; design problems requiring the collection and processing of data; selection of transportation means, development of routes, and evaluation of solutions. Concurrent: CE 96. 3 s.h. *Holland*

CE 118. *Materials of Construction.* Determination of physical and mechanical properties of construction materials and their components; use of properties as a basis for design; effect of loading, time, and environment on properties; design of construction materials. Laboratory included. Prerequisites: Engrg 73 and 83. 2 s.h.

CE 121.* *Hydrology.* Fundamentals of meteorology; precipitation; evaporation. Ground water development. Stream flow and stream gaging. Hydrograph analysis. Flood routing. Field trips to be arranged. Prerequisite: Engrg 128 or 143. 3 s.h. *Bryan*

CE 123. *Fundamentals of Hydraulic Engineering.* Steady pipe flow systems, including compound pipes and pipe loops and system components including pumps, turbines, and valves. Unsteady pipe flow and surge control systems. Analog computer applications to hydraulic transient analysis and design. Flow in open channels. Water surface profiles in prismatic and natural channels. Selected laboratory work. Prerequisite: Engrg 128 or 143. 3 s.h. *Wood*

CE 124. *Fundamentals of Sanitary Engineering.* Elements of descriptive hydrology with particular relevance to water supply and drainage; quantitative physical, chemical, and bacteriological characterization of water and waste-waters; introduction to water treatment processes, and wastewater treatment and disposal systems; elements of environmental sanitation including land, water, and air considerations. Laboratory included. Prerequisite: Chem 2. 3 s.h. *Bryan*

CE 126.* *Sanitary Engineering Design.* Design of facilities for providing an adequate supply of water and means for treatment and disposal of wastes. Stream sanitation as it affects location and design of treatment works. Prerequisites: CE 123 and 124. 3 s.h. *Bryan*

CE 131. *Structural Mechanics I.* Shears, moments, and internal forces by algebraic and graphic methods under various conditions of loading. Deflection of trusses. Prerequisite: Engrg 107. 3 s.h. (Not offered after 1966-67.) *Brown*

CE 131. *Structural Mechanics I.* A unified treatment of the methods of analysis of statically determinant and indeterminant structural systems. Serves as an introduction to the process of applying the engineering method to the creation of structures. Prerequisites: Engrg 73 and Math. 64. 3 s.h.

CE 132. *Structural Design.* Tension, compression, flexural members, eccentric connections, unsymmetrical bending, riveted and welded plate girders, trusses and office building frames. Timber design using ring con-

*Offered only upon sufficient demand; enrollment limited.

nectors. Design and detail drawings. Prerequisite: CE 131. 4 s.h. (Not offered after 1967-68.) *Palmer*

CE 133. Reinforced Concrete. Theory and design of reinforced concrete beams, columns and footings. Moment distribution. Prerequisite: CE 131. 3 s.h. (Not offered after 1966-67.) *Palmer*

CE 133. Structural Design I. Non-homogeneous materials. Theory and design of compression and flexural members. Emphasis on ultimate strength theory for concrete. Timber connections. Selected design problems in concrete to include forms and timber supports. Prerequisite: Engrg 73. Concurrent CE 131. 3 s.h.

CE 134. Structural Design II. Design in metals, primarily steel. Tension, compression, and flexural members. Riveted, bolted, and welded connections, including eccentric connections. Built-up members. Design by elastic and plastic methods. Selected problems to include computations and drawings. Prerequisite: CE 131. 3 s.h.

CE 135. Introduction to Soil Mechanics. Origin and composition of soils, soil structure. Flow of water through soils; capillary and osmotic phenomena. Soil behavior under stress; compressibility, shear strength. Elements of mechanics of soil masses with application to problems of bearing capacity of foundations, earth pressure on retaining walls, and stability of slopes. Prerequisites: Engrg 107, 109, and 128. Concurrent: CE 101. 2 s.h. (Not offered after 1967-68.) *Vesić*

CE 139. Introduction to Soil Mechanics. Origin and composition of soils; soil structure. Flow of water through soils; capillary and osmotic phenomena. Soil behavior under stress; compressibility, shear strength. Elements of mechanics of soil masses with application to problems of bearing capacity of foundations, earth pressure on retaining walls, and stability of slopes. Laboratory included. Prerequisites: Engrg 73, Engrg 83, and CE 123. 3 s.h.

CE 140.* Structural Mechanics II. Analysis of statically indeterminate structures by various methods including those of elastic energy. Prerequisite: CE 131. 3 s.h. *Barton*

CE 143, 144.* Projects in Civil Engineering. These courses may be assigned by the Chairman of the Department to certain seniors who have shown an aptitude for research, in which case they may be substituted for certain civil engineering courses. 3-6 s.h. *Staff*

CE 146. Professional Engineering. Topics related to the practice of civil engineering: engineering economy, contracts, specifications, and ethics. Presentation of student papers on historical and current aspects of civil engineering. Seniors only. 2 s.h. (Not offered after 1967-68.) *Palmer*

CE 148.* Structural Engineering. Structural design utilizing metals, concrete and timber. Planning, preliminary design, organization of design procedures and specifications. Prerequisites: CE 132 and CE 133. 3 s.h. *Palmer*

*Offered only upon sufficient demand; enrollment limited.

CE 150. *Engineering Systems Analysis.* Systems approach to engineering design, and operation problems. Emphasis on linearized models and linear programming. Deterministic models, critical path scheduling, optimization techniques and their application to engineering problems. Prerequisite: Senior standing. 2 s.h.

Graduate Courses

Professor Brown, *Chairman and Director of Graduate Studies*; Professors Abeles, Bryan, Meriam, and Vesić; Associate Professors Hill and Kumar; Assistant Professors Barton, Harrawood, and Wood

CE 201. *Advanced Mechanics of Materials.* Analysis of structural elements described by ordinary differential equations, such as beams on an elastic foundation, curved beams, beam-columns, circular plates; introduction to plates and shells; energy principles and their use in structural analysis. 3 units. *Hill*

CE 202. *Experimental Stress Analysis.* The experimental analysis of stress and strain in deformable bodies, correlation of theory with data from experiments; photoelasticity; strain gauges; dimensional analysis and similitude principles of models. 3 units. *Hill*

CE 205. *Applied Elasticity.* Introduction to linear theory of elasticity; solutions of two-dimensional problems; three-dimensional problems of torsion and bending; stress concentrations; energy and variational principles with applications to design. 3 units. *Meriam*

CE 211. *Mechanical Behavior of Materials.* Macroscopic mechanical properties of materials for static, fatigue, dynamic and creep conditions; impact, shock, and stress wave properties; temperature, creep, viscoelastic and relaxation properties. 3 units. *Kumar*

CE 212. *Structural Materials.* Elasticity and plasticity as related to rheology; natural and synthetic materials; reinforced materials; composites. 3 units. *Kumar*

CE 221. *Incompressible Fluid Flow.* Steady and unsteady pipe flow, theories of turbulent flow; water hammer theory and control; surge tanks; air chambers; the analysis and control of fluid systems; effect of resistance; tapered conductors. 3 units. *Wood*

CE 231. *Structural Engineering.* The application of the fundamental theories of structural action to the design and analysis of structural members; specifications. 3 units. *Brown*

CE 232. *Reinforced Concrete Design.* Design and analysis of reinforced concrete members including the influence of shrinkage and plastic flow; bond and diagonal tension; prestressed concrete members. 3 units. *Brown*

CE 235. *Foundation Engineering.* An introduction to methods of analysis, design and construction of foundations. Bearing capacity and settlement of shallow and deep foundations. Soil exploration; excavation

and bracing; drainage and stabilization; underpinning. Foundation vibrations. 3 units. *Vesić*

CE 243, 244. Sanitary Engineering Unit Operations and Process Design. Fundamental bases for design of water and waste treatment systems, including transport, mixing, sedimentation and filtration, gas transfer, coagulation, and bio-treatment processes. 6 units. *Bryan*

CE 250. Engineering Analysis. General concepts of the solutions of engineering problems with special emphasis on digital and analog computer and numerical methods; deflection and stability; torsion of non-circular beams and multicelled thin-walled structures; vibrations of beams and membranes; structures with both uniform and nonuniform properties and with rigid and nonrigid supports. 3 units. *Barton and Wood*

CE 302. Theory of Plates and Shells. Analysis of stresses and deformation of plates; vibrations of plates; membrane stress systems in shells; cylindrical shell analysis; bending stresses in shells. Prerequisite: CE 201 or CE 205, or equivalent. 3 units. *Hill*

CE 321. Mechanics of Ideal Fluids. Basic equations of ideal fluid flow; potential and stream functions; vortex dynamics; body forces due to flow fluids; methods of singularities in two-dimensional flows; analytical determination of potential functions; conformal transformations; free-streamline flows. Prerequisite: Math 285, 286, or equivalent. 3 units. *Harrawood and Wood*

CE 322. Mechanics of Viscous Fluids. Equations of motion of a viscous fluid; general properties and selected solutions of the Navier-Stokes equations; boundary layer equations with selected approximate solutions; laminar boundary layers in axisymmetric and three-dimensional flows; unsteady laminar boundary layers. Prerequisites: Math 285 and 286. 3 units. *Harrawood*

CE 331, 332. Advanced Structural Design and Analysis. Analytical and behavior concepts of structural components as related to the design of structural systems; classical methods; numerical and approximate techniques; behavior of structural elements under static and dynamic loading; buckling behavior. Prerequisite: CE 231 or equivalent. 6 units. *Barton*

CE 335. Mechanical Behavior of Soils. Origin of soils, soil minerals and processes of soil formation; physical chemistry of multiphase systems and soil structure. Elements of soil stabilization; permeability and flow of water through soils: capillary and osmotic phenomena; seepage problems; soil compressibility; theory of consolidation; shear strength and failure criteria. Stress-strain relationships, volume changes and pore pressures during shear, strength properties. Advanced laboratory soil testing techniques. 4 units. *Vesić*

CE 336. Advanced Soil Mechanics. Theories of plastic and elastic equilibrium of soil masses and their application to analysis of problems such as: pressure on retaining walls, anchored bulkheads, cofferdams, silos, shafts, tunnels; stability of slopes and earth dams; stresses and settle-

ment in soil masses and pavements, piles and pile groups subjected to lateral loads; elements of soil dynamics. Prerequisite: CE 335. 4 units. *Vesic*

CE 365. *Advanced Topics in Civil Engineering.* Opportunity for study of advanced subjects relating to programs within the Civil Engineering Department tailored to fit the requirements of a small group. 1 to 3 units. *Members of the Graduate Staff*

Electrical Engineering

Undergraduate Courses

Professor Wilson, *Chairman*; Professor Meier, *Director of Undergraduate Studies*

EE 53. *Electrical Engineering Fundamentals.* Survey of electrical engineering profession: role of engineering and professional engineering societies in national life; engineering economy; engineering law; technical engineering problems; basic philosophy of engineering education; introduction of staff, curriculum, and facilities of Department of Electrical Engineering. One two-hour session. 1 s.h. (Not offered after 1965-66.) *Kraybill and Meier*

EE 55. *Electric Networks I.* Physical nature of circuit parameters and sources of excitation; volt-ampere relations for circuit elements; network topology; network equations using loop currents and node voltages; solutions of network differential equations by classical and transform methods. Concurrent: Math 63 and Phys 41. Three class sessions and one two-hour computation. 4 s.h. (Not offered after 1965-66.) *George and Hacker*

EE 56. *Electric Networks II.* Network impedance and admittance functions; steady-state response to sinusoidal forcing; Fourier series analysis; pole-zero analysis of networks; matrices in network analysis; introduction to synthesis of reactance networks. Prerequisite: EE 55. Concurrent: Math 64. Three class sessions and one two-hour computation. 4 s.h. (Not offered after 1965-66.) *George and Hacker*

EE 109-110. *Electromagnetic Systems.* Mathematical and physical consideration of energy relations and forces associated with both discrete particles and materials in electromagnetic fields: vector notation; Maxwell's equations; static and quasi-static fields; energy, power flow, and impedance; particle ballistics; electron emission; control of conduction in vacuums, gases, liquids, and solids; resistance, capacitance, and inductance of systems of conductors; forces between relatively moving bodies; dielectric and magnetic material. Prerequisite: EE 56. Concurrent: Math 111. Three class sessions and one two-hour computation 8 s.h. (Not offered after 1966-67.) *Artley and Vail*

EE 111-112. *Electrical Principles Laboratory.* Instruction in electrical laboratory techniques; experimental study of basic principles of electromagnetics, electronics, and electric and magnetic circuits. Prerequisite: EE 56. Concurrent: EE 109-110. Two three-hour laboratory periods throughout first semester; one throughout second semester. 3 s.h. (Not offered after 1966-67.) *Barnes, Frekko, and Plumer*

EE 123. *Fundamentals of Electrical Engineering.* Introductory treatment of electrical engineering fundamentals for students majoring in other branches of engineering; principles of electric circuits, fields, and electronics. Prerequisites: Math 63 and Phys 42. Concurrent: EE 125. Three class sessions. 3 s.h. *Kerr, Meier, and Trickey*

EE 124. *Industrial Electrical Engineering.* Introductory treatment of industrial applications of electrical engineering fundamentals for students majoring in other branches of engineering; alternating- and direct-current machinery; electronic and electromagnetic control systems; illumination principles. Prerequisite: EE 123. Concurrent: EE 126. Three class sessions. 3 s.h. *Kerr and Trickey*

EE 125. *Electrical Fundamentals Laboratory.* Laboratory course paralleling course EE 123, with which it should be taken concurrently. One three-hour laboratory. 1 s.h. *Bumgardner and Plumer*

EE 126. *Industrial Electrical Laboratory.* Laboratory course paralleling course EE 124, with which it should be taken concurrently. One three-hour laboratory. 1 s.h. *Bumgardner and Plumer*

EE 127.* *Electronics for Engineers.* Introductory treatment of principles and applications of engineering electronics for students majoring in other branches of engineering; amplifiers; feedback; basic communications and control circuits; electronic computers. Prerequisite: EE 123 and permission of instructor. Three class sessions. 3 s.h. *Staff*

EE 159.* *Transmission.* Development of theory underlying transmission of electric energy over conductors at both power and communication frequencies. Two class sessions and one two-hour computation. Prerequisite: EE 110 and Math 111. Elective for electrical majors. 3 s.h. *Staff*

EE 161. *Electronics and Signals.* Techniques for the analysis and design of electronic circuits with emphasis on graphical and piece-wise-linear methods; applications of these methods to particular circuits, including transistor and tube amplifiers, oscillators and switching circuits. Introduction to amplitude-, frequency-, and pulse-modulation systems. Prerequisite: Engrg 113. Two class sessions and one computation or laboratory session. 3 s.h. *Staff*

EE 162. *Electromechanical Energy Conversion.* Principles of energy storage and conversion utilizing magnetic and electric fields; analytical treatment of dynamic equations of motion, including the Euler-Lagrange approach; applications to the design of electromechanical transducers

*Offered only upon sufficient demand; enrollment limited.

and rotating machines. Prerequisites: Engrg 113, 123, and 163. Two class sessions. 2 s.h. *Staff*

EE 163. *Physical Electronics.* Study of physical processes under the influence of electric, magnetic, thermal, and stress fields with contemporary electrical engineering applications: e.g., transistors, thermoelectric energy converters, and magnetic devices. Prerequisites: Engrg 163 and Phys 161. Corequisite: EE 164. Two class sessions and one computation or laboratory. 3 s.h. *Staff*

EE 164. *Electromagnetic Fields and Waves.* Electric and magnetic fields; Maxwell's equations developed from Coulomb's, Ampere's and Faraday's laws and the solenoidal nature of the magnetic field; electrostatics; magnetostatics; quasi-static and stationary fields; electromagnetic waves; retarded potential; relaxation time, reflection, polarization, and radiation of electromagnetic waves; transmission lines; probability waves in periodic structures. Prerequisite: Engrg 163. Two class sessions and one computation or laboratory. 3 s.h. *Staff*

EE 165-166. *Electrical Engineering Seminar.* A course which provides an opportunity to consider matters related to the professional practice of electrical engineering; to relate the undergraduate program of studies to current practice; and to improve the ability to communicate more effectively, both in verbal and written form, particularly with regard to technical material. One class session. 2 s.h. (Not offered after 1967-68.) *Staff*

EE 167. *Design Colloquium.* A course planned to guide the student in learning how the fundamental principles studied in the academic program are translated into the realities of engineering practice. The vehicle will be an extensive and intensive study of a significant modern engineering project. Extensive reference to published information and possible site visits to the projects will be part of the mode of operation, as will written and oral reports. 2 s.h. *Staff*

EE 173-174.* *Projects in Electrical Engineering.* A course which may be undertaken only by seniors who show special aptitude, or who may have had previous experience directly related to the proposed project. The consent of the Chairman of the Department must be obtained before registering. Elective for electrical majors. 3-6 s.h. *Staff*

EE 177.* *Energy Transmission and Radiation.* A more advanced treatment of electromagnetic theory than is afforded by EE 109-110, with particular application to wave guides and antennas. Prerequisite: EE 110 and permission of instructor. Three class sessions. 3 s.h. *Artley*

EE 179.* *Advanced Electrical Measurements.* Theory and practice of measurements of electrical quantities at extremes of voltage, current, power, and frequency. Two class sessions and one three-hour laboratory. Prerequisite: EE 110 and permission of instructor. 3 s.h. *Owen*

* Offered only upon sufficient demand; enrollment limited.

EE 181-182. *Electronic Networks.* Advanced topics in engineering electronics: piece-wise linear approximation for nonlinear operation and incremental models for linear operation of basic electronic circuits; narrow- and wide-band amplifiers; feedback amplifiers; oscillators; modulation and demodulation; microwave devices; communication systems. Prerequisite: EE 110. Concurrent: EE 183-184. Three class sessions. 6 s.h. (Not offered after 1967-68.) *George and Owen*

EE 183-184. *Electronics Laboratory.* Laboratory course paralleling and integrated with course EE 181-182, with which it should be taken concurrently. One three-hour laboratory. 2 s.h. (Not offered after 1967-68.) *Feng and Rechten*

EE 191-192. *Electric Machinery.* Application of circuit and field principles to underlying theory of static and rotating electric machinery; mathematical techniques for analyzing transformers and electromechanical energy converters as individual devices and when interconnected into systems. Prerequisite: EE 110. Concurrent: EE 193-194. Three class sessions. 6 s.h. (Not offered after 1967-68.) *Meier and Trickey*

EE 193-194. *Energy Conversion Laboratory.* Selected experiments in energy conversion combining the theory and practice of transformers, electro-mechanical devices including motors and generators, photovoltaic sources, thermo-electric generators, static d-c to a-c and d-c to d-c converters. Prerequisite: EE 112. Concurrent: EE 191-192. 2 s.h. (Not offered after 1967-68.) *Bumgardner, Trickey, and Rechten*

EE 195.* *Nuclear Engineering Fundamentals.* Review of nuclear physics; fission and the chain reaction; nuclear reactor principles and concepts; materials, instrumentation, and control of nuclear reactor; selected topics in nuclear engineering. Prerequisite: permission of instructor. 3 s.h. *Meier and Wortman*

EE 197. *Solid-State Materials.* Prediction and explanation of the response of ferroelectric, ferromagnetic, ferrimagnetic, and semiconductor materials to thermal, electric, magnetic and stress fields. Exploration of possibilities of improving the materials. Two class sessions and one three-hour laboratory. Prerequisites: Math 111 and one course from among Phys 161, EE 110, CE 118, and ME 59. 3 s.h. *Pilkington*

EE 199.* *Linear Feedback Systems.* Analysis and design of linear; continuous-data feedback control systems; stability tests; time and frequency domain methods; root locus method; performance specifications; study of electrical, mechanical, hydraulic, aerodynamic, pneumatic, and thermal systems. Two class sessions and one three-hour laboratory. Prerequisite: permission of instructor. 3 s.h. *Wells*

Graduate Courses

Professor Wilson, *Chairman*; Professor Owen, *Director of Graduate*

*Offered only upon sufficient demand; enrollment limited.

Studies; Professors Artley, Meier, and Vail; Associate Professors Burger (Adjunct), Kerr, and Wells; Assistant Professors George, Hacker, and Pilkington; Lecturers Hampikian (Visiting) and Trickey

EE 201. *Energy Systems.* Application of general energy concepts to specific engineering devices and systems; use of mathematical models to describe concepts of energy storage, transfer, transformation, and control that are applicable to electromagnetic, mechanical, fluid, and thermal systems; the Lagrangian, Hamiltonian formulation, and tensors. Prerequisite: permission of instructor. 3 units. *Artley*

EE 203, 204. *Information Systems.* General concepts of information storage, transfer, and processing; information theory, coding, noise theory, and response of information-handling systems in the time and frequency domains. Applications of information concepts to specific engineering situations: modulation, sampling, optimum filtering, detection in presence of noise, and comparisons of various systems. Prerequisite: permission of instructor. 6 units. *Owen, Kerr, and George*

EE 207.* *Network Synthesis.* Linear network theory, including a review of time and frequency domain analysis; network graphs; network functions and realizability conditions; driving point impedance synthesis of passive networks; driving point and transfer specifications; approximation methods. Prerequisite: permission of instructor. 3 units. *Owen and Vail*

EE 211. *Solid-State Theory.* The fundamental theory of wave motion in solids, including wave mechanics; variational method; perturbation theory; many-electron problems; one-electron approximation; free-electron approximation; electron spin; Brillouin zones; time-dependent Schrödinger's equation; and transition probabilities. Introduction to the thermodynamics of solids, including Maxwell-Boltzmann, Bose-Einstein, and Fermi-Dirac statistics; ensembles; entropy; and free-energy functions. Prerequisite: permission of instructor. 3 units. *Artley, Burger, Hacker, Pilkington, and Vail*

EE 212. *Solid-State Materials.* Concepts of solid state physics as applied to engineering materials: electrical, magnetic, thermal, and mechanical properties of solids; dielectrics; ferroelectrics; semiconductors; magnetic materials; and superconductors. Prerequisite: EE 211. 3 units *Artley, Burger, Hacker, Pilkington, and Vail*

EE 222. *Nonlinear Analysis.* Introduction to methods of analyzing engineering systems described by nonlinear differential equations: analytic, numerical, graphical, and series approximation methods; analysis of singular points; stability of nonlinear systems. Application of various methods, such as the modified Euler, Runge-Kutta, isoclines, perturbation, reversion, variation of parameters, residuals, harmonic balance, Bendixon, and Liapounov to phenomena of nonlinear resonance, subharmonics, relaxation oscillations, and forced oscillating systems. Prerequisite: permission of instructor. 3 units. *Wilson*

*Offered only upon sufficient demand; enrollment limited.

EE 231.* Nuclear Engineering. Review of nuclear physics; fission and the chain reaction; nuclear reactor principles; materials, instrumentation, and control of nuclear reactors; selected applications and techniques of nuclear engineering. Prerequisite: permission of instructor. 3 units. *Meier*

EE 241.* Feedback Control Systems. Analysis and design of linear sampled-data systems; linear systems subjected to random inputs; analytical design using mean square error and integral square error criteria; non-stationary and nonlinear systems. Prerequisite: permission of instructor. 3 units. *Wells and Wilson*

EE 259.* Advanced Electric Energy Conversion. Equations of motion of electromechanical systems, fields and lumped parameters, state function concepts; mathematical techniques for analyzing electromechanical devices and systems; transducers; unified treatment employing matrix, tensor, and block-diagram concepts to obtain response under static and dynamic conditions; the generalized rotating machine. Prerequisite: permission of instructor. 3 units. *Meier, Trickey, and Wilson*

EE 265.* Advanced Topics in Electrical Engineering. Opportunity for study of advanced subjects related to programs within the electrical engineering department tailored to fit the requirements of a small group. Prerequisite: approval of the Director of Graduate Studies and of instructor under whom work will be done. 1 to 3 units. *Members of the Graduate Staff*

EE 271. Electromagnetic Theory. The classical theory of Maxwell's equations; electrostatics; magnetostatics; boundary value problems, including numerical solutions; currents and their interactions; and force and energy relations. Prerequisite: permission of instructor. 3 units. *Artley, Hacker, and Pilkington*

EE 272. Applications of Electromagnetic Theory. Propagation of plane, spherical, and guided electromagnetic waves; cavities; propagation in anisotropic media; network representation of microwave structures; and measurement techniques. Selected laboratory work. Prerequisite: EE 271 or permission of instructor. 3 units. *Artley, George, and Hacker*

EE 311. Quantum Theory in the Engineering of Materials. Concepts of the quantum theory of solids as applied to the molecular design of engineering materials. Topics selected will vary somewhat with the interests of the class, but the importance of quantized fields in crystals (phonons, magnons, plasmons, excitons, and polarons) and the interaction of these fields will be stressed. Prerequisites: EE 212 and Phys 316. 3 units. *Pilkington*

EE 313.* Magnetism. A study of ferromagnetic and ferrimagnetic materials, including effects of thermal conditions and treatment, mechanical stress, magnetic field intensity, crystal structure, and macroscopic

*Offered only upon sufficient demand; enrollment limited.

geometry. Study emphasizes relationships of fundamental concepts of engineering interest. Prerequisite: EE 211 or equivalent. 3 units. *Artley, Hacker, and Wilson*

EE 315, 316.* *Solid-State Devices.* Study of terminal parameters and functional characteristics of electronic devices in terms of the properties and structural configurations of their constituent materials. First semester emphasis on such semiconductor devices as transistors and on integrated semiconductor circuits; second semester emphasis on other types of solid-state devices. Prerequisite: permission of instructor. 6 units. *Burger, Hampikian, and Pilkington*

EE 321. *Nonlinear Electromagnetics.* Mathematical description of nonlinear magnetic and semiconductor characteristics; transient and steady-state analysis and synthesis of nonlinear systems with application to such topics as magnetic amplifiers, frequency converters, oscillators, computer logic, and switching devices. Prerequisite: permission of instructor. 3 units. *Wilson*

EE 342. *Optimum Control Systems.* Use of variational methods in control system design; classical calculus of variations; dynamic programming; Pontriagin's maximum principle; computer applications in control. Prerequisite: permission of instructor. 3 units. *Kerr*

EE 343. *Nonlinear Control Systems.* Analysis and design of nonlinear feedback control systems; approximations for small and for large disturbances; phase-plane analysis; describing-function techniques; relay servomechanisms, optimum and quasi-optimum performance; nonlinear compensation. Prerequisite: permission of instructor. 3 units. *Kerr, Wells, and Wilson*

EE 399.* *Special Readings in Electrical Engineering.* Special individual readings in a specified area of study in electrical engineering. Prerequisite: approval of the Director of Graduate Studies. 1 to 3 units. *Members of the Graduate Staff*

Mechanical Engineering

Undergraduate Courses

Professor, Kenyon, Acting Chairman and Director of Undergraduate Studies

ME 52. *Kinematics, Kinetics.* Analytical and graphical studies of displacement, velocity, and acceleration in mechanical elements and systems. Synthesis and analysis of mechanisms for machines. Prerequisite: Engrg 2. Concurrent: Math 63, Phys 41. 3 s.h. (Not offered after 1965-66.) *Nash*

*Offered only upon sufficient demand; enrollment limited.

ME 59. *Materials and Processes.* Elementary metallurgy and introduction to modern theories of the solid state; selection and properties of engineering materials and effect of forming processes upon properties. Prerequisite: Chem. 2. 3 s.h. (Not offered after 1967-68.) *Pearsall*

ME 101-102. *Engineering Thermodynamics.* A basic study of the laws of thermodynamics and their use in engineering analysis and design. Properties of pure substances; vapor cycles; fluid flow; thermodynamic machinery; introduction to combustion processes. Prerequisites: Chem 1 and Phys 42. Concurrent: Math 64. 6 s.h. (Not offered after 1966-67) *Boyle, Harman, and Kenyon*

ME 102. *Thermodynamics II.* A basic study of various thermodynamics phenomena and their use in engineering analysis and design. Examination of the dynamic properties and phenomena from macroscopic and microscopic points of view. Prerequisite: E 101. 3 s.h. (Beginning 1967-68.)

ME 103. *Thermodynamics.* A terminal course in thermodynamics and its engineering applications for civil and electrical engineering students. The basic laws of thermodynamics; gases; vapors; elements of combustion and heat transfer. Prerequisite: Chem 1 and Phys 42. Concurrent: Math 64. 3 s.h. (Not offered after 1966-67). *Elsevier*

ME 105. *Dynamics of Fluids.* A study of liquids at rest and in motion. Principles of laminar and turbulent flow through pipes, orifices, nozzles, and metering devices; impulse and momentum concepts; vortex action, pumps, turbines and fluid couplings; resistance of immersed and floating bodies. Prerequisite: Phys 41 and Math 63. 3 s.h. (Not offered after 1965-66.) *Buzzard*

ME 106. *Heat Transfer.* A basic course covering the elements of radiation, conduction, and convection. Methods of temperature measurement, steady and transient heat flow, analytical and numerical methods. Concurrent: ME 102, 105 and Math 64. 3 s.h. (Not offered after 1966-67.) *Buzzard*

ME 114. *Junior Mechanical Engineering Laboratory.* Measurement of mechanical and thermodynamic properties of systems. Student planning and reporting of laboratory experiments in temperature, pressure, velocity, acceleration, flow, energy and power measurements. Concurrent: ME 101-102, 105, and 106. 2 s.h. (Not offered after 1966-67.) *Staff*

ME 116. *Mechanical Engineering Laboratory.* Primarily for civil and electrical engineering students. Selected laboratory experiments in measuring mechanical and thermodynamic properties of systems. Student planning of experiments in temperature, pressure, velocity, acceleration, flow, energy and power measurements. Concurrent: ME 103. 1 s.h. (Not offered after 1966-67.) *Staff*

ME 128.* *Dynamics of Gases.* The flow of compressible fluids at high velocities. One-dimensional compressible flow; area change; normal

*Offered only upon sufficient demand; enrollment limited.

shock; friction and heat transfer; Mach number. Prerequisite: ME 102. Concurrent: ME 106. 3 s.h. *Buzzard*

ME 133. *Mechanical Design I.* Study of the geometry of mechanisms with regard to the motions obtained; introduction to toothed gearing, cams, linkages, and intermittent motion devices. Kinematics and kinetics of linkages; the instant center; velocity, acceleration, and inertia force polygons. Prerequisite: Math 63. Concurrent: E 123. Two class sessions and one computation or laboratory session. 3 s.h.

ME 134. *Mechanical Design II.* Application of kinematic and kinetic analyses to practical problems in the design of machine elements. Study of stress, deflection, materials and factors of safety as related to specific function and shape of machine elements. Two class sessions per week. Prerequisite: Mechanical Design I. 2 s.h.

ME 136. *Response of Systems.* System design for optimum dynamic response. Instrumentation and development of mathematical models from physical systems; operational and computer techniques; matrix methods for lumped and distributed systems; introduction to nonlinear phenomena. Concurrent: Math 111. Two class sessions and one computation or laboratory session. 3 s.h.

ME 141. *Machine Design.* Elements of mechanism with special attention to the role of invention in mechanical design. Velocity and acceleration in mechanisms from both scalar and vector viewpoints. Prerequisite: Math 63. Concurrent: ME 52 and E 57 or 60. 3 s.h. (Not offered after 1966-67.) *Djordjevic and Linderoth*

ME 142. *Machine Design.* Continuation of ME 141. Static and dynamic forces in machinery. The instant center; theory of gear tooth profiles. Design of machine elements, such as gears, springs, and bearings; complex parts. Prerequisite: ME 141. Concurrent E 107. 3 s.h. (Not offered after 1966-67.) *Djordjevic and Linderoth*

ME 153.* *Heating, Air Conditioning and Refrigeration.* Principles of thermodynamics, heat transfer and fluid flow applied to comfort and industrial air conditioning. Cycles and equipment for heating, cooling, and humidity control. Air transmission and distribution. Modern vapor compression, absorption and low temperature refrigeration cycles and systems. Prerequisite: ME 102 and 106. 3 s.h. *Elsevier*

ME 156. *Combustion Engines.* A study of cycles, fuels, and fuel mixtures in piston, ram jet, and rocket engines. Comparison of real and theoretical cycles; carburetion and fuel injection systems; modern development. Prerequisite: ME 102. 3 s.h. (Not offered after 1967-68.) *Elsevier*

ME 157.* *Pumps, Compressors and Turbines.* An introduction to the theory and design of centrifugal pumps and compressors, axial-flow compressors, impulse and reaction turbines, and gas turbine plants, combustors.

*Offered only upon sufficient demand; enrollment limited.

tion systems and regenerators. Concurrent: ME 102 and 106. 3 s.h.
Boyle

ME 159-160. Senior Mechanical Engineering Laboratory. Laboratory determination of heat flow and operating characteristics of engines, fans, pumps, and other power and refrigeration plant components; vibrational systems, control systems, analog methods. Student planning and reporting of original experiments. 2 s.h. (Not offered after 1967-68.) *Staff*

ME 161. Mechanical Engineering Laboratory. Laboratory experience designed to involve the student in real engineering problems and to reinforce his understanding of some of the basic principles in the areas of thermodynamics, systems response, heat transfer and fluid mechanics. One class session and one three-hour laboratory session each week. Prerequisite: senior standing. 2 s.h.

ME 162. Power Plants. Basic concepts of thermodynamics, heat transfer and fluid flow are combined with industrial data for the consideration of real power plant problems. Selection of steam generators, prime movers, fans, pumps, heaters, and piping systems with regard to engineering and economic points of view. Prerequisite: ME 102. 3 s.h. (Not offered after 1967-68.) *Harman*

ME 163.* Vibration Control. An introduction to the dynamics of mechanical systems; equilibrium, stability, lumped and distributed systems, cradle and field balancing. System analysis by classical differential equations, mechanical impedance, operational calculus and analog simulation. Prerequisite: Math 64 and ME 141. 3 s.h. *Macduff*

ME 164.* Engineering Analysis. A study of a series of engineering problems with particular reference to mathematical and graphical methods of solution and engineering interpretations of results. Concurrent: Math 64. 3 s.h. *Boyle*

ME 166.* Air Conditioning Design. Typical air conditioning systems considered in relation to specific problems. Equipment analysis and performance, economic considerations, system control and response, noise generation and attenuation. Prerequisite: ME 153. 3 s.h. *Elsevier*

ME 167.* Industrial Engineering. A study of the organization and functioning of industries; function of engineering in industry; job analysis and self evaluation; professional and executive responsibility of the mechanical engineer. Prerequisite: senior standing. 3 s.h. *Lewis*

ME 168.* Industrial Engineering Production Methods. Study of engineering theory, methods and controls in production. Methods, motion and time study, plant lay-out, production and quality control, industrial safety, operations research. Prerequisite: senior standing, ME 167 or equivalent. 3 s.h. *Lewis*

ME 171. Response of Physical Systems. An introduction to the basic fundamentals of instrumentation and of the control of processes and sys-

*Offered only upon sufficient demand; enrollment limited.

tems with emphasis on correlation of analysis and experimental results. Concurrent: Math 111. 3 s.h. *Macduff*

ME 173-174. *Mechanical Engineering Seminar.* A course designed to keep the students abreast of progress in the engineering field and to develop their ability to express ideas effectively in speech and writing. Open to seniors only. 2 s.h. (Not offered after 1967-68.) *Staff*

ME 182.* *Fundamentals of Nuclear Engineering.* Review of nuclear physics, nuclear interactions and cross sections, neutron induced chain reactions, shielding, hazards, isotope utilizations, reactor systems, and power reactors. Prerequisite: permission of instructor. 3 s.h. *Kenyon*

ME 197-198. *Projects in Mechanical Engineering.* This course may be assigned by the Chairman of the Department to outstanding seniors who express a desire for such work and who have shown aptitude for research in one distinct field of mechanical engineering. Prerequisite: 3.0 average and senior standing. 1-6 s.h. *Staff*

Graduate Courses

Professor Kenyon, *Acting Chairman and Director of Graduate Studies*; Professors Linderoth, Macduff, and Meriam; Associate Professors Boyle, Elsevier, Harman, and Pearsall; Assistant Professor Buzzard

ME 201.* *Theoretical and Applied Mechanics.* Introduction to the theory of elasticity, and vibration analysis. 3 units. *Meriam*

ME 202.* *Theoretical Thermodynamics.* Classical thermodynamics based on the First, Second, and Third Laws of Thermodynamics. Classical and statistical thermodynamics of ideal gases. Properties of real gases, equilibrium, combustion, and irreversible processes. 3 units. *Harman*

ME 221.* *Analysis of Compressible Fluid Flow.* Flow of compressible fluids; concepts of subsonic, sonic, and supersonic flow; experimental methods. 3 units. *Harman*

ME 222.* *Analysis of Heat Transfer.* Heat transfer by conduction, convection, and radiation; lumped and distributed heat capacity, resistance, losses; steady and transient flow. 3 units. *Buzzard*

ME 231-232.* *Systems Engineering.* Methods of obtaining parameters for strength, response, and stability studies of mechanical systems. Impedance and operational means of analysis; mechanical and electronic analogs; nonlinear theories. 6 units. *Macduff*

ME 265.* *Advanced Topics in Mechanical Engineering.* Opportunity for study of advanced subjects related to programs within mechanical engineering tailored to fit the requirements of a small group. Prerequisite: approval of the Director of Graduate Studies and of instructor under whom work will be done. 1 to 3 units. *Members of the Graduate Staff*

ME 280.* *Nuclear Reactor Power Cycles.* Introduction to basic reactor

*Offered only upon sufficient demand; enrollment limited.

principles and reactor types. Consideration of thermodynamic cycles for nuclear reactors for stationary and mobile plants. Analysis of fluid flow and heat transfer problems unique to reactors with development of methods of reactor safety techniques. Metallurgical problems peculiar to reactor design. 3 units. *Kenyon*

Non-Engineering Subjects in Curricula

Chem 1, 2. *General Inorganic Chemistry.* Lectures and recitations on the elementary principles of chemistry and on the structure, properties, preparation and uses of the elements and their compounds. The laboratory work includes qualitative analysis of some of the more common metals. Two lectures, one recitation, and three laboratory hours throughout the year. Chemistry 1 is a prerequisite for Chemistry 2. Prerequisite: Qualification for Math 21. 8 s.h.

Engl 1-2. *Freshman Composition.* Training in composition through the writing of weekly expository themes. The theme subjects derive from assigned reading drawn from British and American literature of the Twentieth Century. English 1 takes up the Essay, the Short Story, and the Novel; English 2, the Play and the Poem. The student attends each week (1) a general lecture on the reading for the week; (2) a section meeting, where the instructor and a small group discuss problems of composition and literature; and (3) an individual conference in which the instructor reads and grades the weekly theme and makes special assignments according to the needs of the student. 6 s.h.

Math 21, 22. *Introductory Calculus.* Real and complex numbers, rectangular and polar coordinates, graphs, trigonometric and inverse trigonometric functions, logarithmic and exponential functions, conic sections, limits, derivatives, maxima and minima, methods of integration, areas, volumes. Prerequisite: three units of college preparatory mathematics. Math 21 is prerequisite for Math 22. 6 s.h.

Math 63, 64. *Intermediate Calculus.* Moments, centroids, indeterminate forms, Taylor's formula, approximation of integrals, improper integrals, infinite series, vectors and solid analytic geometry, partial derivatives, multiple integrals, introduction to ordinary differential equations. Prerequisite: Math 22 for 63; and 63 for 64. 6 s.h.

Math 111. *Applied Mathematical Analysis I.* Ordinary and partial linear differential equations with constant coefficients, Fourier series and their applications, vectors. Not open to students who have had Math 131. Prerequisite: Math 64. 3 s.h.

Math 112. *Applied Mathematical Analysis II.* Complex variables, residues, conformal mapping, matrices, Laplace and Fourier Transforms and their applications. Prerequisite: Math 64. 3 s.h.

Phys 41-42. General Physics. Treats the basic principles of general physics in a more quantitative manner than Physics 1-2. It meets in a thorough way the physics requirement for entrance into the study of either medicine or engineering, and is well suited for the general science student. This course is not open for credit for students who have completed Physics 1-2. Three lecture-recitations and one three-hour laboratory period each week. Prerequisite: Mathematics 21, 22 or equivalent (Mathematics 21, 22 may be taken concurrently). 8 s.h.

Phys 161. Modern Physics. Review of electromagnetic fields, relativity, quantum phenomena, atomic and molecular spectra, solids, and nuclear physics. Three lectures each week. Prerequisites: Phys 41-42 and Math 22. Phys 161 is prerequisite for 162. 6 s.h.

For additional non-engineering courses consult the *Bulletin of Undergraduate Instruction*.

Recommended Minor Subjects for Graduate Students

Chem 206. Elements of Theoretical Chemistry. A one semester course in the principles of physical chemistry. Credit is not given for both 206 and 161-162. Three recitation and three laboratory hours. Prerequisite: Chemistry 70, Physics 41-42, and Mathematics 22. 4 units.

Math 221. Digital Computer. History of computers; number representation, information, storage, logical arithmetic; components and organization of computing systems; coding and programming; programmed arithmetics, function and functional subroutines, interpretive routines, compilers; error analysis. A fee of \$8.00 to provide for materials and clerical services of the Computing Laboratory is charged for this course. The fee is payable to the Treasurer's Office of Duke University at the beginning of the semester. Prerequisite: Mathematics 22. 3 units.

Math 222. Introduction to Numerical Analysis. Error analysis, real and complex roots of equations, finite difference methods and theory of interpolation, numerical differentiation and integration, numerical integration of ordinary and partial differential equations, simultaneous equations and matrix inversion. Prerequisite: Math 221. 3 units.

Math 283. Probability for Engineers. Basic probability concepts, sample space, discrete and continuous events, permutations and combinations, conditional and marginal probability, discrete and continuous distributions, expected values and moments, sampling distributions, estimations, hypothesis testing, confidence intervals, multiple regression, one-way analysis of variance. Prerequisite: Math 64. 3 units.

Math 285. Applied Mathematical Methods I. Vectors, line and surface integrals, tensors, complex variables, differential and integral equations. Prerequisite: Math 64. 3 units.

Math 286. *Applied Mathematical Methods II.* Wave equation, Fourier series, heat equations, telegraphic equation, Legendre polynomials, Bessel functions. Schrödinger's equation. Prerequisite: Math 64. 3 units.

Math 289. *Applications of Stochastic Processes I.* Recurrent events, random walk, Markov chains and processes, queuing theory, branching and diffusion processes. Prerequisite: Math 135 and 140, or consent of instructor. 3 units.

Math 290. *Applications of Stochastic Processes II.* Recurrent events, random walk, Markov chains and processes, queuing theory, branching and diffusion processes. Prerequisite: Math 289 or consent of the instructor. 3 units.

Math 291-292. *Theory of Functions.* Limits, implicit functions, power series, double series, Cauchy's theorem and its applications, residues, Riemann surfaces, conformal mapping. Prerequisite: Mathematics 64 for 291; and 291 for 292. 6 units.

Med 205. *Physiological Models.* Primarily intended for students with some background in electrical engineering. It will cover the following topics: energy transformation and storage in single cells; membrane model circuit diagrams and cable properties; membrane non-linear-current relations; nerve impulse transmission; excitation and inhibition; mechanics and thermodynamics of muscles; electrical analysis of cardiovascular-respiratory systems. 3 units.

Phys 201, 202. *Mechanics.* The fundamental principles of Newtonian mechanics, general dynamics of systems of particles and rigid bodies, the methods of Lagrange and Hamilton; generalized mechanics. 6 units.

Phys 213, 214. *Contemporary Physics.* A course which covers the fundamental concepts and the experimental basis of modern physics. Three lectures each week. 6 units.

Phys 221, 222. *Theoretical Physics.* Mechanics of particles and of rigid bodies, elasticity, fluids dynamics, electrodynamics, optics, relativity, thermodynamics, statistical mechanics, wave mechanics. Prerequisite: Math 285, 286 or equivalent to be taken at least concurrently. 6 units.

For additional courses consult the *Bulletin of The Graduate School of Arts and Sciences.*



The School of Forestry



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Forestry in Duke University

Duke and the School of Forestry

Duke University, located at Durham, North Carolina, comprises Trinity College, the Woman's College, the College of Engineering, the Graduate School of Arts and Sciences, and the professional schools of Forestry, Divinity, Law, Medicine, and Nursing. The University dates from 1838, when Union Institute was founded in Randolph County by the Methodists and Friends. In 1851 the institution became Normal College, one of the first schools in America for the training of teachers. In 1859 the name was changed to Trinity College and so continued until 1924, when the College became a part of Duke University.

By virtue of an indenture of trust, executed December 11, 1924, by James Buchanan Duke, a great benefaction was placed at the disposal of humanity by providing for hospitalization, church work in rural communities, and education. The principal feature of the educational provision was the creation of Duke University.

The University, with a student body of over 6,900, occupies two campuses. The Woman's College campus of 108 acres was formerly the campus of Trinity College. About a mile west are the newer units of the University, known as the West Campus, totaling 467 acres. It was first occupied in September, 1930.

Forestry at Duke University began early in 1931 when the Duke Forest was placed under intensive forest management and forestry

research was initiated. An academic-forestry curriculum, designed for men and women intent upon pursuing the study of forestry as a profession, was organized in Trinity College of Duke University in 1932. This program was enlarged in 1952 and now includes more than 60 co-operating colleges and universities. (See pages 48-51).

In 1938 the School of Forestry was organized at the graduate level and a curriculum was offered leading to the degree Master of Forestry. Work leading to the degree of Doctor of Forestry has been offered since 1940. The School has been fully accredited since its origin. A degree in forestry at the undergraduate level is not offered at Duke University.

Graduates of recognized colleges and universities, and professional schools of forestry, and other students who meet the entrance requirements of the School (see page 6), may enroll for training in forestry leading to the professional degrees, Master of Forestry and Doctor of Forestry. The Department of Forestry in the Graduate School of Arts and Sciences also offers graduate work in certain aspects of forestry leading to the degrees Master of Arts and Doctor of Philosophy. This work is available to graduates of schools of forestry of recognized standing, and to college or university graduates holding a Bachelor's degree.

Students taking undergraduate work and who are planning to matriculate in the School for programs of study leading to the degrees Master of Forestry or Doctor of Forestry should refer to the section in this announcement (page 6) where entrance requirements are presented.

Educational Facilities

General and Research Facilities

The School of Forestry is housed in the south wing of the Biological Sciences Building on the West Campus. The programs of the School provide for classroom, laboratory, and field instruction in the fundamental disciplines of forestry and wood science. Specialized training may be elected in forest management, forestry or forest products business management, forest economics, silviculture, silvics, forest entomology, forest biometry, forest pathology, forest biochemistry, mensuration, forest soils, tree physiology, forest hydrology, forest climatology, wood anatomy, timber physics, chemistry of wood, harvesting and processing, and several other areas in forest products technology.

General and research laboratories are provided for routine and original studies in all of the subject matter fields. These laboratories are equipped with instruments and facilities for quantitative evaluation of biological materials and processes. Greenhouses immediately adjacent to the Biological Sciences Building and the nearby Duke Forest offer excellent facilities for biological investigations in controlled and natural environ-



Excellent greenhouse facilities are available for study of the biology of forest trees.

ments. An IBM 7072 Digital Computer system (with supporting 1401 system), housed in the Physics Building, is available for processing research data.

Facilities of allied departments of the University are also available for advanced work in chemistry, economics, genetics, mathematics, plant anatomy, plant ecology, plant pathology, and plant physiology.

West Virginia Pulp and Paper Company has made available to Duke University a field headquarters for work in the forests of the South Atlantic Coastal Plain. This camp, located 18 miles northwest of Summer-ville, South Carolina, is used as a base for field instruction in timber har-vesting, wood utilization, soils, silviculture, and forest management.

The School periodically sponsors conferences and symposia on industrial forest management and other technical and scientific sub-jects. These offer the current viewpoints of many outstanding individuals in both forestry and in allied fields.

The University library, with 1,716,855 volumes and about 4,000,000 manuscripts, provide exceptional resources and facilities for study and research by undergraduate and graduate students, and by visiting scholars. About 70,000 volumes are added annually, while 125 foreign and domestic newspapers and over 8,000 periodicals are received cur-rently. Large collections of microfilms of rare books, newspapers, and periodicals are also available.

The Biology-Forestry library (84,228 volumes), Chemistry library (21,813), Physics-Mathematics library (29,069) are housed for con-

venience of use in the buildings of these departments. The libraries of the Schools of Divinity (120,098), Law (139,827), Medicine (71,644), and of the College of Engineering (34,905) are also shelved in the buildings of these schools, all on the West Campus.

The Duke Forest

The Duke Forest, of approximately 7,000 acres, is particularly well situated for field work. A five-minute walk from the campus will take one well into many parts of the area, while even the most distant portions can be reached by automobile in about twenty minutes.

Short-term research projects are conducted on the Forest by graduate students in forestry, botany, zoology, and other disciplines. More extensive problems are investigated by the faculty with student assistance, segments of which may be used by students for observation, analysis, and interpretation. Many of these studies serve admirably as instructional material. The Forest provides additional instructional material, as well as demonstrations on an operational scale, of advanced forest practices developed at Duke and elsewhere.

The Forest lies in Durham and Orange Counties near the eastern edge of the Piedmont Plateau. A cross-section of much of the woodlands in the upper coastal plain and lower Piedmont of the Southeast is represented on the Forest with its variety of topography, soil, forest conditions, and patterns of past land use. Elevations range from 280 to 760 feet. The soils are derived from such diverse parent material as metamorphic rock of the Carolina slate formation, granite, Triassic sedimentary rock, and basic intrusives. Nearly one hundred tree species are repre-

Field trips throughout the Southeast permit personal exposure to current trends in intensive forestry.





The Duke Forest is well utilized by students to test theories concerning the tree and its environment. Here a student monitors the uptake of radioisotopes in a plantation.

sented. Some eighteen miles of improved woods roads make all parts of these woodlands readily accessible. It serves as an outdoor laboratory for instruction in forestry and allied fields, and as an experimental forest for research in problems of timber growing and in the sciences basic thereto. It is also used to demonstrate methods of silviculture and forest management applicable to the region.

At few other places in America are there provisions for extensive field study and research in forestry literally at the door of a large university. This natural outdoor laboratory, so conveniently located and representative of the region, is a most valuable supplement to the instructional, laboratory, and library facilities of Duke University.

Forest Sciences Laboratory

The establishment of the Forest Sciences Laboratory research facility of the United States Forest Service's Southeastern Forest Experiment Station in the Research Triangle Park near Durham provides an unusual opportunity for complementing the research programs of students in the School of Forestry. Specialized research projects in forest entomology, pathology, physiology and soils are currently under way at the Laboratory. The research staff of the Laboratory is available for consultation, participation in seminars, and service on graduate committees of students in the School of Forestry. Arrangements may also be made for students to conduct certain aspects of their research at the Laboratory.

Requirements for Admission to the School of Forestry

Master of Forestry

The admission requirements of the School of Forestry for work toward the Master of Forestry degree presuppose that an applicant is either:

1. A graduate of a professional school of forestry, or
2. A graduate of a college or university of high standing, but without prior professional training in forestry, or
3. A student who has successfully completed the pre-forestry curriculum of one of the colleges (listed on pages 48-51) cooperating with the School in the academic-forestry training program.

Each applicant must present a certified transcript of his academic record showing the courses he or she has taken, the number of credit hours he or she has earned, and the grades received. Although specific courses are not required for admission, applicants must be aware that many fields within forestry require academic preparation of a specialized nature. Deficiencies, if any, may be satisfied in residence, possibly prolonging the time necessary to complete degree requirements. Students interested in specialized areas of forestry should write the Dean for advice as to specific preparatory courses.

An applicant who is a graduate of a professional school of forestry will present a certified transcript of his or her scholastic record showing the

attainment of a degree. Before registering for the first semester of residence, the students will be required to select the branch or branches of forestry in which they wish to concentrate the major part of their work and to prepare their proposed programs in conference with an appropriate faculty advisory committee. Ordinarily, graduates of a fully accredited school of forestry should be able to meet all requirements for the Master of Forestry degree in one full school year of resident study; others may require a longer period of residence.

Students must apply for admission in advance of the opening of the school year; those entering without acceptable courses in forest surveying, forest mensuration, and dendrology must take the work in these subjects in the Summer Session, and are required to submit their applications prior to May 1. Students entering with advanced standings in these courses should make application before September 1. Application blanks will be sent upon request made to the Dean of the School of Forestry.

Doctor of Forestry

Admission to the School of Forestry for a program of study and research leading to the degree, Doctor of Forestry, is granted to a student who has received the degree, Master of Forestry, or its equivalent.

An applicant must file a formal application for admission together with transcripts of his undergraduate and graduate academic records. In his application he should clearly state the branch of forestry in which he desires to concentrate, and if possible, the specific research.

The Director of Admissions of the School of Forestry, together with the prospective student's major advisor, will determine if the qualifications of the applicant meet entrance requirements.

Grades

Grades in the School of Forestry are as follows: *E* (exceptional); *G* (good); *S* (satisfactory); *F* (failing); and *I* (incomplete).

An *I* (incomplete) indicates that some portion of the student's work is lacking, *for an acceptable reason*, at the time grades are reported. The instructor who gives an *I* for a course specifies the date at which the student must have made up the deficiency, in no case more than one calendar year from the date the course ended. If the course is not completed, the grade of *F* is entered upon the student's record unless his appeal to the Dean for the grade *No Credit* is approved.

A grade of *F* in any course normally occasions withdrawal from a degree program.

Requirements for the Degree of Master of Forestry

The requirements for the degree of Master of Forestry (M.F.) are governed by the extent of the student's previous professional training. Normally, students who have earned the degree of Bachelor of Science in Forestry, or equivalent, from an accredited school of forestry may complete the requirements for the M.F. degree in one academic year. Students who have had no prior professional training in forestry are required to complete one summer session and two academic years of resident study. Graduate work of equivalent grade done in residence at other institutions may, with the approval of the Faculty, be accepted as credit toward the degree, but a minimum of one year of residence at Duke University is required.

The submission of a thesis for the M.F. degree usually is required. With the approval of the Faculty, an acceptable report on a special study may be submitted in lieu of a thesis, credit for which will not exceed three semester hours. Four copies of the thesis, typewritten and bound in accordance with regulations set forth by the Faculty, must be deposited with the Dean of the School of Forestry on or before May 15 of the academic year in which the student expects to obtain the M.F. degree.

A student who has not completed his thesis while in residence must submit an acceptable manuscript to the faculty within a period of two years following the termination of his residence.

No student may take less than fourteen nor more than eighteen semester hours of credit per semester without special permission of the Faculty.

Post-Professional Program

Students with satisfactory undergraduate professional training qualify for advanced study and research in the various disciplines of forestry under this program. A specific study plan is developed for each student through consultation with a faculty advisory committee. For the student planning a managerial career in the general area of forest production or in forest products technology (and where the Master of Forestry is planned as a terminal degree), these study plans usually consist of courses and seminars with a major portion of the work concentrated in the areas of the student's interests. For the student with research interest, the study plan is oriented within the subject matter field of interest toward the furtherance of a research career, or toward preparing him for academic training beyond the master's level.

A number of senior-graduate courses offered in other departments of the University (see pages 43-46) are open to qualified students in the School of Forestry. One or more of these may be included in a student's study plan when deemed advisable by his advisory committee.

A minimum of thirty semester credit hours, in which the student must earn a grade of E or G in at least six hours, are required for the degree, Master of Forestry, under this program. Normally, 15 hours of credit (including thesis) must be earned in the School of Forestry.

Post-Liberal Arts and Sciences Program

Men and women who have had no prior professional training in the areas of specialization offered in the School of Forestry are required to begin their studies with a summer term of eleven weeks. Two full academic years of study in addition to the work of the Summer Session are required under this program for the attainment of the degree, Master of Forestry. Any student who does not earn a grade of E or G in at least six hours of work in the first academic year will not be permitted to enter into the work of the second year.

Summer Session

S.H.

Dendrology (F. 141).....	3
Forest Surveying (F. 150).....	3
Forest Mensuration (F. 151).....	4
Timber Harvesting Techniques (F. 152)....	1

First Year

<i>Fall Semester</i>	S.H.	<i>Spring Semester</i>	S.H.
Forest-tree Physiology (F. 201)	3	Harvesting and Utilization of Forests (F. 212)	3
Forest Entomology (F. 230)	3	Harvesting and Forest Products Field Seminar (F. 218)	1
Silvics (F. 243)	3	Forest Pathology (F. 223)	3
Forest Soils (F. 261)	3	Theory and Practice of Silviculture (F. 244)	3
Forest Economics (F. 270)	3	Forest Biometry (F. 250)	3
		Wood Anatomy (F. 290)	3

Second Year

<i>Fall Semester</i>	S.H.	<i>Spring Semester</i>	S.H.
Forest Management (F. 281)	3	Forest Policy (F. 276)	3
Electives and thesis research	12-15	Electives and thesis research	12-15

During the latter part of the second semester of the first year each student will be requested to designate the subject matter field (or fields) he wishes to pursue in the second year. Those who successfully complete the work of the first year will be assigned a faculty advisory committee who, in consultation with the student, will develop his study plan in a manner identical with that described under the Post-Professional Program (see page 9).

Business Management Program

A specialized program is offered in the School of Forestry, in cooperation with the Department of Economics and Business Administration to prepare forestry graduates for managerial careers in the business aspects of industrial forest land management or forest products. The program requires two years of study and training leading to the degree Master of Forestry. It is open to selected students who have earned a Bachelor's Degree in general forestry, forest management, forest utilization, or wood science and technology, and who have potential leadership qualities indicative of administrative and executive capacity.

The general requirements of the program are as follows:

1. At least 10 courses (30 semester hours) in economics and business administration or in closely allied fields.
2. Approximately five courses (15 semester hours) in forestry which deal with principles of administration and decision-making.

3. Experience as a paid managerial trainee with a cooperating firm for a period embracing the included summer and fall semester of the second year.
4. A written analysis of some phase of the managerial operation of the organization with which the training period is spent.

A specific program of study, commensurate with each student's academic background and future goals, will be developed by the program Advisory Committee in consultation with the student. A sample list of suggested courses included in such a program of study is available on request.

Students entering this program must meet the admission requirements of the School of Forestry and be approved by a committee representing the faculties of Economics and Forestry. The financial award benefits of the School of Forestry are available to applicants for this program (see page 30). Application forms for admission and financial aid may be obtained from the Director of Admissions of the School of Forestry upon request.

Requirements for the Degree of Doctor of Forestry

The degree Doctor of Forestry (D.F.) is a professional and research degree conferred on those students who have satisfactorily completed specified requirements of advanced study and research.

Work toward the D.F. degree, consisting of advanced studies in a major and a minor field, is offered with majors in the several branches of forestry. A minor may also be elected in forestry or in other areas of specialized study in the University approved by the faculty of the School of Forestry. Prospective students should correspond with the Director of Admission of the School of Forestry on all matters pertaining to admission to the School.

Program of Study

A committee consisting of at least four members, including a major advisor, will be appointed by the Dean to supervise the work of each student. The major advisor will serve as Committee Chairman.

The advisory committee, in consultation with the student, will prepare a proposed program of study and research. If in the judgment of the Committee the student's prior training is inadequate, he may be required to remedy such deficiencies by taking certain undergraduate courses as prerequisites to continued graduate study, but which will carry no graduate credit.

The program will consist of courses, seminars, arranged work, and research, approved for graduate credit by the faculty of the School of Forestry. Satisfactory completion of a minimum of 30 semester hours of formalized academic work in which the student must attain a grade of E or G in at least nine hours is required of all prospective candidates. Credit hour requirements for the major and minor fields are determined by the Committee. The student's program of study necessarily demands substantial concentration on courses in his major department. A minor, if elected, will consist of at least 12 semester hours, part or all of which may have been included in the program for the Master's degree. If a minor is not elected, a minimum of six semester hours in a single subject matter area outside the major field must be included in the program of study.

Foreign Languages

A reading knowledge of two foreign languages is required. Normally these will be French and German. Spanish or another foreign language may be substituted for either French or German when deemed advisable by the Committee. At least one of the language requirements must be met during or before the student's first regularly enrolled semester at Duke University. Students not able to comply with this regulation will be required to reduce their maximum allowable load in succeeding semesters by 3 semester hours until the first language requirement has been met. The second language requirement must be met before the student is permitted to take the comprehensive preliminary examination. Enrollment in non-credit language courses at Duke University will be considered a part of the student's maximum allowable load in any one semester. For methods of meeting language requirements see page 21.

Comprehensive Examination

At least six months before the student expects to receive the D.F. degree, and after he has completed most of his formal course work, he will be required to take a comprehensive examination. The examination will be written in subject areas specified by the Committee and may be followed by an oral examination given by the Committee. The decision as to whether the examination has been passed or failed is the responsibility of the Committee.

Privilege of Re-Examination. Should the student fail the comprehensive examination, he may apply, with the consent of his supervisory committee and of the Dean of the School of Forestry, for the privilege of a second examination to be taken no sooner than three months after the date of the first. Failure on the second examination will render the student ineligible to continue his program for the D.F. degree at Duke University.

Upon satisfactory completion of the comprehensive examination the student will be considered a candidate for the D.F. degree.

Residence Requirements

The minimum period of study beyond the M.F. degree, or its equivalent, is two years of academic work of which at least two regular semesters must be spent in full-time study on the campus in Durham. Graduate work of a fragmentary nature taken over a period of several years will not meet this requirement. Course work of equal grade taken at another college or university of approved standing may, with approval of the Faculty of the School of Forestry, be accepted in partial fulfillment, but shall not exceed 15 semester hours of the total requirements. Such transfer of credit may not under any circumstances be used to reduce the two regular semesters of full-time study which must be spent at Duke University. Course work taken under the cooperative interchange-of-registration plan between the graduate schools of Duke University and the Consolidated University of North Carolina is considered the same as work taken on the campus in Durham.

A student who has successfully completed the 30 hours of required formalized study, met the language requirements, and passed the comprehensive examination may, with the approval of his supervisory committee and the Dean of the School of Forestry, continue his research and complete his dissertation *in absentia*. Under this arrangement he is required to register for one hour of research credit each semester until the degree has been awarded.

A student who remains in residence after passing the preliminary examination must register for a minimum of three semester hours of research credit each semester unless his course-seminar registration is at least nine hours, in which case the 3-hour registration requirement is waived.

Dissertation

In addition to obtaining adequate training in the field of his specialty, the student must demonstrate his ability to plan and conduct sound, original research. Evidence of this accomplishment must be presented in the form of an acceptable dissertation embodying the results of original work, which is a definite contribution to knowledge. Course credit is not granted but students must register for dissertation research.

The subject of the dissertation must receive the approval of the Faculty, and the title must be filed with the Dean of the School of Forestry on or before October 15 of the academic year in which the candidate desires to take his final examination.

The dissertation will normally be submitted for acceptance within two calendar years after passing the preliminary examination. Should it not be submitted within four calendar years after the examination, the candidate may, with the approval of his committee, petition the Dean of the School of Forestry for an extension of one year.

If the dissertation is not submitted and accepted within five years after the examination, the candidate must pass a second preliminary examination. Following the second examination, the student's doctoral committee will determine possible additional requirements and set time limits within which the dissertation must be completed and accepted.

After the dissertation has been approved by the major advisor, and at least 10 days prior to the date set for the final examination, the candidate is required to deposit with the Dean of the School of Forestry the original and three typewritten and temporarily bound copies together with 10 copies of an abstract of the dissertation consisting of not more than 600 words. Following acceptance of the dissertation by the Committee, the student will deposit with the Dean of the School of Forestry on or before April 15 of the academic year in which the student expects to obtain the D.F. degree the original unbound copy of the dissertation together with three carbon copies (also unbound) and 10 copies of the approved abstract. The first carbon copy will be deposited in the University Library; the major advisor will receive one copy; and the fourth copy will be returned to the student. The original copy will be sent to University Microfilms, Ann Arbor, Michigan, where it will be reproduced and published on microfilms. Later the original will be returned to Duke University where it will be bound and deposited in the University Library.

The basic requirements for preparing the dissertation are described in the *Manual of Style for Theses and Dissertations* which may be obtained from the Duke University Book Store, West Campus. Additional instructions concerning the microfilming and the preparation of title page and abstract should be obtained from the Dean's office.

At the time the final approved copies of the dissertation and the abstract are deposited with the Dean of the School of Forestry, the candidate must show evidence of having paid a fee of \$25.00 to the Bursar of the University to cover the costs of microfilming.

Final Examination

The final examination will be in defense of the candidate's dissertation and on related subject matter. It will be oral and will be conducted by the advisory committee. At least six months must elapse between the dates of the preliminary and the final examinations.

Requirements for the Degree of Doctor of Philosophy

The Doctor of Philosophy degree (Ph.D.) is conferred through the Graduate School of Arts and Sciences of Duke University. Programs of study and research for men and women working toward the attainment of this degree are directed by faculty members of the School of Forestry who also comprise the graduate faculty of the Department of Forestry in the Graduate School. Both major and minor programs of study are available in the following branches of forestry: forest biochemistry, forest biometry, forest climatology, forest ecology, forest economics, forest entomology, forest hydrology, forest pathology, forest soils, forest-tree physiology, and wood science including wood anatomy, timber physics, and wood chemistry.

The Ph.D. degree is essentially a research degree. Although course work is a necessary part of the student's program, the mere accumulation of course credits will not be sufficient for attaining this degree. The granting of the Ph.D. is based primarily upon the student's knowledge of a specialized field of study and upon the production of an acceptable dissertation embodying the results of original research.

Requirements for the Ph.D. Degree

The formal requirements, discussed in detail below, for the Ph.D.

degree are as follows: (1) foreign languages; (2) major and minor courses; (3) supervisory committee for program of study; (4) residence; (5) preliminary examination; (6) dissertation; (7) final examination. In order to be considered for candidacy for the Ph.D. degree, the student must have passed all of his course work in the first year of graduate study; on at least 9 units of course work he must have made a grade of C or better.

Foreign Languages

Normally, a reading knowledge of both French and German is required. (For methods of meeting this requirement, see p. 21.)

A student working toward the doctoral degree should complete the language requirements for that degree by the end of his first year of residence. If he fails to meet these requirements by the end of his third semester of residence, he must register in the appropriate special reading course or courses (see page 23) until he has satisfied the requirements.

Major or Minor

The student's program of study necessarily demands substantial concentration on courses in his major department. It must, however, include a minimum of six units in a minor subject or related fields approved by his major department. Use of related fields within the major department requires the approval of the Dean of the Graduate School.

Committee to Supervise the Program of Study

As early in a student's course of study as is practicable and *not later than two months before the preliminary examination* the Director of Graduate Studies in the major department will nominate for the approval of the Dean a supervising committee of five, one being designated as chairman. This committee will include at least three members of the major department and one from the minor department if a minor is involved. This committee will draw up a program of study and administer the preliminary examination and, with such necessary changes as are approved, the final doctoral examination. However, should all members of the committee be from the major department, at least one member of another department will be added or substituted for the final doctoral examination. The final examination may be administered with a minimum of four members.

When the preliminary examination is arranged, the committee and the Director will submit to the Dean the student's program of study bearing a statement that the Department's course and language requirements have been or are being completed.

Residence

For students who first registered in September, 1959, or thereafter, the *minimum* registration requirement is 60 units of graduate credit not more than 30 units of which may be accepted by transfer. Since a full program is 30 units per academic year, the prospective Ph.D. candidate who enters with the A.B. or B.S. degree must plan to spend in residence a *minimum* of two academic years; if he enters with the A.M., M.S. or M.F., his *minimum* residence is one academic year. If there are undergraduate deficiencies in his program, he may in addition to the minimum requirements be required to take preliminary undergraduate courses for which he will not receive graduate credit. Even if there are no such undergraduate deficiencies, the student's supervisory committee will determine what requirements if any above the minimum the student must meet.

Time Limitations. 1) At the time that the preliminary examination is passed any courses, language certifications, or other credits for advanced standing which are more than six calendar years old will not be accepted toward fulfilling the minimum requirements of the doctoral degree.

2) The student should normally pass the preliminary examination by the end of his second year of graduate study. If he has not passed it by the middle of the third year, he must file with the Dean of the Graduate School a statement explaining the delay and setting a date for the examination. Except under unusual circumstances, extension will not be granted beyond the end of the third year.

3) The doctoral dissertation should be submitted and accepted within two calendar years after the preliminary examination is passed. Should the dissertation not be submitted and accepted within four years after the examination, the candidate, with the approval of his committee, may petition the Dean of the Graduate School for an extension of one year. Should this extension be granted and the dissertation not be submitted and accepted within the year, the student to remain a candidate for the degree must pass a second preliminary examination. In such a case, the time limit for submitting the dissertation will be determined by the Dean of the Graduate School and the candidate's committee.

Credit for Summer Work. Credit earned in the Summer Session will not reduce the minimum required residence (see above, p. 18).

Preliminary Examination

A student is not accepted as a candidate for the Ph.D. degree until he has passed the preliminary examination. A transfer student who may have passed a preliminary examination elsewhere must nevertheless take the examination in this Graduate School. The examination ordinarily covers both the major and minor fields.

Except in unusual circumstances approved by the Dean, a preliminary

examination will not be scheduled between the last day of the spring semester examination period and registration day in the fall semester.

Privilege of Re-Examination. Should the student fail the preliminary examination, he may apply, with the consent of his supervisory committee and of the Dean of the Graduate School, for the privilege of a second examination to be taken no sooner than three months after the date of the first. Failure on the second examination will render the student ineligible to continue his program for the Ph.D. degree at Duke University.

The Dissertation

The dissertation is expected to be a mature and competent piece of writing, embodying the results of significant and original research.

Filing Title. Not later than March 1 (March 2 if March 1 falls on Sunday) preceding the June commencement at which the degree is expected to be conferred, the student must file with the Dean of the Graduate School, on the official form to be obtained from the Graduate Office, the title of the dissertation. This title must receive the written approval of both the Director of Graduate Studies of the student's major department and the professor who directs the dissertation.

Form. The basic requirements for preparing the dissertation such as quality of paper, form, and binding are prescribed in the instructions for microfilming (see below) and in the *Manual of Style for Theses and Dissertations*, revised 1961, to be obtained from the Duke University Book Store, West Campus.

Submitting Dissertation. The dissertation must be completed to the satisfaction of the instructor who directs it. Four typewritten copies bound in snap binders obtained in the Library must be deposited with the Dean of the Graduate School on or before April 15 preceding the June commencement when the degree is to be conferred. The dissertation must be submitted to the Graduate Office from seven to ten days before the scheduled date of the student's examination.

Publication on Microfilm. All doctoral dissertations will normally be published on microfilm through University Microfilms, Ann Arbor, Michigan. Authors may, if they wish, also copyright them. The abstract will be published in *Dissertation Abstracts*. Before final typing is completed, the candidate should obtain in the Graduate Office detailed instructions on the procedure together with a microfilming agreement which is signed and returned when the dissertation is finally deposited in the Graduate Office.

In brief, all copies of the dissertation, the original in clean type, will remain unbound except for spring binders. Ten copies of an abstract, carefully written and not more than 600 words long, are submitted when the dissertation is first presented to the Graduate Office. A non-returnable dissertation fee of \$25 is charged for handling and microfilming. If copy-

right is desired, an additional fee is charged of \$6 plus 2½ cents per page. The original copy and first carbon copy will be bound by the Ruzicka Bindery. The fee is \$5.00 a volume. The student may request that more than the two copies be so bound.

Final Examination

The final oral examination shall be primarily on the dissertation. Questions may, however, be asked in the candidate's major field. Except in unusual circumstances approved by the Dean a final examination will not be scheduled between the last day of the spring examination period and registration day in the fall semester.

If a student fails his final examination, he may be allowed to take it for a second time, but not sooner than six months from the date of his first. Permission to take the second examination must be obtained from the instructor who directed the dissertation and from the Dean of the Graduate School. Failure to pass the second examination renders the student ineligible to continue work for the Ph.D. degree at Duke University.

Application for Admission

Applications for admission into Ph.D. programs in forestry should be submitted to the Director of Admissions, Duke School of Forestry, for transmittal to the office of the Dean of the Graduate School.

Language Requirements and Procedures for Students in Doctoral Programs

Because a requirement for a doctoral degree is the mastery of two acceptable foreign languages, the prospective graduate student should attain mastery of at least one of them, and preferably two before applying for admission.

The facilities for graduate study are highly specialized and costly. The student who must lay them aside to acquire what he could have learned as an undergraduate is wasting his time.

To prevent delay in meeting this requirement, students whose programs call for mastery of French, Spanish, or German and who have studied the language must take the objective screening examination at their first registration period.

Acceptable Languages

The languages normally required are French, German, and Russian, but a student may substitute for any one of these another language which has a definite relation to the candidate's program of work for the degree and for which an examination can be provided.

Meeting the Requirements

Language requirements may be met before, during, or after first registration here in the following ways:

Before First Registration

1. *By Transcript.* With the permission of the Dean and of the chairman of his program committee, the doctoral student may file a transcript or other certification as evidence of having passed a comparable examination at another graduate institution. The limitations are that (1) only one of the two doctoral requirements may be met in this way, (2) the other institution offers a doctoral program in the student's major and that the examination would have met a doctoral requirement there, and (3) the examination was passed no more than five years before first registration here.

2. *By ETS Scores.* The Educational Testing Service Graduate School Foreign Language tests in French, German, and Russian are offered at many centers including Duke University Counseling Center upon nationally uniform dates. Scores on these tests taken elsewhere not more than five years before first registration here may be offered to meet the master's degree requirement of one language or the doctoral requirement of two.

At First Registration

On Monday of the fall registration period and on the day before spring registration, objective reading, grammar, and vocabulary tests in French, German, and Spanish are offered (see the Calendar for hour and place). Any entering student in the master's or doctoral program may take them. On the basis of his scores the student will be (1) certified as meeting requirements in these languages, (2) advised after review to present himself for the ETS tests (French, German) or the locally-prepared reading test in Spanish, or (3) advised to enroll in the special reading course (see below).

After First Registration

1. Students who first registered in September, 1964, and thereafter, and who wish to be examined in French, German, or Russian will take the ETS tests. For Spanish they will take the locally-prepared reading test.

2. Students who began a program before September, 1964, may take either the ETS test or the locally prepared reading tests in French, German, Russian, Spanish, and, upon request, Italian.

Reading examinations in other languages must be individually ar-

ranged. Each ETS examination requires a fee of \$8. The student who requires a re-examination in the locally prepared reading examination at scheduled times will be charged \$5 for each re-examination; if special times are necessary, the fee will be \$10. Examinations at special times cannot be offered in French and Spanish.

Special Reading Courses

Special courses designed to assist graduate students in acquiring a reading knowledge of French or German are offered for three hours a week, French during the fall semester, German during the spring semester and the Summer Session. A student who registers for either course must reduce his normal load of graduate courses by three units, with no reduction in fees. *No auditors* are permitted in these courses at any time.

Requirements for Foreign Students

Foreign students whose native language is not English are, during their first registration period, required to take a test for minimum competence in English. Such students, with the approval of the Director of Graduate Studies in their major department, may request substitution of English for *one* of the required foreign languages in the doctoral program. If permission is granted, an additional reading test in English will be arranged.

Tuition, Fees, and Expenses

The following table shows the general fees and charges collected from all students. All fees for each semester are due and payable, unless otherwise specified, at the time of registration and no student is admitted to classes until arrangements have been made with the Bursar of the University for the settlement of fees. Financial information is subject to change without notice.

General Fees

Tuition, per semester.....	\$625.00
General Fee, per semester.....	\$ 72.50
Spring field seminars.....	\$ 10.00
Absentia Fee, per semester (when applicable)....	\$ 40.00

Forestry students may obtain admission to all regularly scheduled University athletic contests held on the University grounds during the entire academic year by payment of an athletic fee of \$15.00 per year plus any Federal taxes that may be imposed. This fee is payable in the fall semester.

Transcripts

A student is entitled to one free transcript of his academic record. A charge of one dollar is made for each additional copy.

Payments to Fellows and Scholars

Payments by the University of stipends to fellows and scholars are made in eight monthly installments, beginning October 20. Fellows and scholars are required to pay the regular tuition fee and such additional fees as are ordinarily required of all graduate students.

Living Accommodations

Housing

The Men's Graduate Center is available to men of the graduate and professional schools. It contains bedroom facilities for four hundred men, complete with lounges, study rooms, recreational rooms, post office, and dining hall. The rooms are equipped for two persons and the rental charge for a double room is \$620.00 for the academic year, or \$310.00 for each occupant, or \$155.00 for each occupant each semester.

Rooms are rented for the academic year, but for no period of less than one semester. No refund of room rent will be made except for involuntary withdrawal to enter the armed services. Such refunds will be made in accordance with the University's established schedules.

Room reservations are made through the Director of Housing only after official acceptance for admission to the University. A \$25.00 room deposit is required of each applicant before a room reservation is made. The initial room deposit is effective during the student's residence in the University if attendance is continuous in regular academic years. This deposit will be refunded under the following conditions:

1. Within thirty days after the student has been graduated.
2. Upon withdrawal from the University, provided written notice is received by the Director of Housing by August 1, for cancellation of a reservation for the fall semester; and not later than January 15, for cancellation of a reservation for the spring semester.
3. When the reasons requiring withdrawal are beyond the student's control.

No refund is made until the occupant has checked out of his room through the Director of Housing and has settled all of his accounts with the Treasurer.

A resident student, in order to retain his room for the succeeding academic year, must make application at the office of the Director of Housing for confirmation of the reservation in accordance with the plan that is published during the school year.

Any exchange of rooms must be arranged with the Director. Persons exchanging rooms without approval will be subject to charges for both rooms.

The authorities of the University do not assume responsibility for the persons selected as roommates. Each student is urged to select his roommate when the room is reserved.

Beds and mattresses (39" x 74"), tables, chairs, dressers, mirrors, and window shades are furnished by the University. The student supplies linens, blankets and pillows. Rugs, totaling not more than 54-square-feet, study lamps and curtains are permissible, and if desired, are furnished by the students.

Duke University Apartments are available to married graduate students. The rental rates per month have been set at \$70 for an efficiency apartment, \$90 for a one-bedroom apartment, and \$110 for a two-bedroom apartment. For further information on apartments for married students, write to the Director of Housing, Duke Station, Durham, North Carolina.

Duke University desires to provide for its students a residential environment conducive to academic achievement, the development of high ideals, and sound character. The institution asks and believes that each student will cooperate in achieving these aims by arranging his personal belongings in an orderly manner, by caring for the buildings and furniture as he would in his own home, and by observing a code based on gentlemanly behavior in an educational environment which demands respect for all residents. Regulations governing the occupancy of rooms will be supplied directly from the Housing Bureau when room reservations are made. Occupants are expected to abide by these regulations.

Women students will be housed in graduate women's facilities at comparable rate noted on page 25. For further information write, Director of Housing, Duke University, Durham, N. C.

Firearms (including air rifles) may be brought into the residence halls only upon written permission and registration with the Dean of Men of Duke University.

Dining Service

The dining facilities on the West Campus include three cafeterias with multiple-choice menus, and the Oak Room where full meals and a la carte items are served. The cost of the academic year ranges from \$550.00 upward depending on the tastes of the individual.

In the Men's Graduate Center there is a cafeteria with multiple-choice menus and a Coffee Lounge where sodas and sandwiches are served from 11:30 A.M. to 11:00 P.M. The prices in these dining rooms are the same as those on the West Campus.

Due to the large number of those served in the dining halls, it is not

possible to arrange special diets for individual students. Special diet for the sick is served in the infirmary.

Estimated Expenses for an Academic Year

The necessary expenses of a graduate student are moderate. The University dormitories provide thoroughly comfortable and wholesome living conditions at a minimum cost, while all charges made by the University have been kept low. Incidental expenses naturally depend upon the tastes and habits of the individual. The following table summarizes expenses in the School of Forestry for one year:

	<i>Low</i>	<i>Moderate</i>	<i>Liberal</i>
Tuition	\$1250.00	\$1250.00	\$1250.00
General Fees	145.00	145.00	145.00
Room-rent	\$ 310.00	\$ 310.00	\$ 380.00
Board	\$ 500.00	\$ 550.00	\$ 600.00
Laundry	25.00	35.00	45.00
Books	50.00	60.00	70.00
Athletic Fee (optional)	15.00	15.00	15.00
Spring field seminars	10.00	10.00	10.00
	<u>\$2305.00</u>	<u>\$2375.00</u>	<u>\$2515.00</u>

Medical Care

Forestry students who pay at least $\frac{3}{5}$ full tuition and fees for the semester or the term of the Summer Session during which illness occurs are eligible under the Student Health Program. They are not covered during vacations and their dependents and members of their family are not covered at any time. Care is provided for men at the Student Health Office in Duke Hospital and for women at the Women's College Infirmary.

The service provided includes hospitalization in Duke Hospital, when recommended by the Hospital staff, to a limit of thirty days; medical and surgical care under the supervision of a senior physician or surgeon; drugs, X-ray work, and ward nursing. Students pay for board while in the hospital. Excluded from the service are refraction of eyes, treatment of teeth and of all chronic and pre-existing conditions, and elective surgery.

Forestry students are urged to carry adequate health insurance to supplement Student Health Program service. If students have insurance providing hospitalization, surgical, or medical benefits, the benefits shall be applied to the cost of their medical care. The complete medical facilities of the Duke University Medical Center are available to all members of the University community.

Motor Vehicles

Every motor vehicle operated on the campus by students enrolled in Duke University must be registered at 08 Social Science Building within five days after arrival and thereafter must display the proper decal emblem. To register a vehicle, the student must present the following documents: (1) state vehicle registration, (2) state operator's license, (3) evidence of automobile liability insurance as required by North Carolina law (\$5,000 per person, \$10,000 per accident for personal injuries; \$5,000 for property damage).

All students owning motor vehicles and living in a University dormitory are required to pay an annual parking rental fee of \$30.00.

Student Activities and Services

Student Activities

Forestry students new to Duke University are reminded that they are welcome to use such recreational facilities as swimming pools, tennis courts, golf course, and to affiliate with choral, instrumental, drama, and religious groups.

Students are encouraged to maintain broad professional contacts by participation in the activities of the Society of American Foresters, the Forest Products Research Society, the national honorary scientific society of Sigma Xi, and other societies appropriate to their major field of study.

The social and business events of the Forestry Club provide opportunities for many pleasant extracurricular activities. An active organization of the wives of forestry students offers a regular schedule of social occasions of interest to this group.

University Counseling Center

The University maintains a Counseling Center which provides a centralized program of educational, vocational, and personal counseling for students. In addition, the Bureau administers special group testing programs for University schools and departments and serves as the local testing center for a wide variety of national testing programs. The Bureau also carries on programs of research in the field of measurement and counseling.

Appointments Office

Duke University maintains an active Appointments Office which has steadily been placing students in teaching, governmental and industrial

positions. The services of this office are available without charge to graduate students. Those who are interested in securing employment through the Appointments Office, or those who wish to have available for their own use a complete file containing their academic record and pertinent recommendations, should register in this office.

Financial Aid

Fellowships, Scholarships, and Assistantships

A number of fellowships, scholarships, and assistantships are allocated to the School of Forestry for the encouragement and financial assistance of men and women who offer promise of becoming leaders in the forestry profession. These are awarded to applicants of high character on the basis of scholastic ability as judged by previous educational performance, professional experience, personal references and the Graduate Record Examination.

Holders of the awards will pay tuition and such additional fees as are regularly required.

The awards are of three classes:

Fellowships

From five to eight fellowships, with stipends ranging from \$1800-\$3000 per academic year. Each recipient must have previously completed work equivalent to that required at Duke University for a Master's degree with a major in forestry or in a discipline basic to forestry. He will devote his time to an approved program of study and research in any of the branches of forestry. He is expected to become a candidate for the degree of Doctor of Forestry or Doctor of Philosophy.

Scholarships

From fifteen to eighteen scholarships with stipends ranging from \$1400-\$2500 per academic year. Each recipient will normally devote his time to an approved program of study leading to the degree of Master of Forestry, or Master of Arts with a major in forestry.

Graduate Assistantships

One to several graduate assistantships with variable stipends up to \$4000, depending upon available funds and upon whether granted for the academic year only, or the academic year plus the summer. Each recipient will devote half-time to research or other work of the School of Forestry. He will be permitted to enroll for not more than 20 semester hours in an academic year in an approved program of study, or study and research, leading to a degree of Master of Forestry, Master of Arts, Doctor of Forestry, or Doctor of Philosophy.

Two industry-sponsored stipends are also awarded annually to qualified scholars. These are: *The Koppers Company, Inc. Scholarship* of \$1600.00; and *The Brunswick Pulp and Paper Company Fellowship for Research in Hardwood Silviculture* of \$2000.00.

Application for Awards

Any student admitted to the School of Forestry is eligible to apply for a fellowship, a scholarship or an assistantship. Application for these awards may be made concurrently with the application for admission.

The general procedures and requirements for applying for any financial award in the School of Forestry are outlined below. Applicants should initiate the necessary action early to insure that the required documents are filed with the Dean of the School of Forestry on or before March 1 prior to enrollment.

1. File award application. Form will be supplied by the School of Forestry on request.
2. Furnish supporting documents as follows:
 - a. Official transcripts of record of all previous college or university credits earned.
 - b. Letters of reference from at least three persons familiar with the applicant's character, scholarship, and professional ability.
(Documents offered in support of admission, if so designated, may also serve in support of the application for financial award.)
3. Complete the Aptitude Test of the Graduate Record Examination. Instructions and application for admission to this locally administered examination are available on most college campuses, from the Duke School of Forestry, or by writing the Educational Testing Ser-

vice, Princeton, New Jersey. Applicants should plan to take this examination in January or earlier.

Notification of awards is made on April 1. In case vacancies occur, completed applications received after March 1 will be considered at a later date.

In every instance where a graduate assistantship, scholarship, or fellowship for the next academic year is offered to an actual or prospective graduate student and accepted before April 15, the acceptor may resign his appointment without prejudice prior to that date by notification in writing to the Dean. However, an acceptance given or left in force after April 15 obligates him not to accept another appointment without first obtaining formal release from the Dean of the School.

Student Loans

Students who are enrolled as full-time degree candidates and who have satisfactory academic and citizenship records are eligible to apply for student loans.

Loans from university funds generally mature after borrowers have left the University. Interest accrues on long-term loans from University funds at the rate of one percent per annum from the date of each note. After a student has left the University permanently, the loans begin accruing interest at the rate of three percent per annum for a period of five years. Interest accrues at the rate of six percent after the three percent ceases to be effective.

In addition to local loan funds, Duke University participates in the student loan program established under the provisions of the National Defense Education Act of 1958. Repayment of these loan funds normally begins one year after the student terminates full-time study. Interest accrues at the rate of three percent per annum commencing one year after termination of full-time study. Upon completion of the period of grace of 12 consecutive months, the ten-year annual repayment period begins, and simple interest on the loan at the rate of three percent starts to accrue. At this point the borrower still has one additional year before his first annual payment becomes due. The first annual installment will therefore fall due 24 months after the borrower has ceased being a full-time student in an institution of higher learning.

Special benefits to those teaching in non-profit schools, colleges, and universities permit a portion of the loan to be cancelled depending upon the length of teaching service.

Complete details regarding the student loan program may be obtained by writing to the Student Loan Division of Duke University. In approving loan applications, the Student Loan Committee selects those

students who, from the standpoint of character, scholastic attainment, personality and degree of financial need, are deserving of this consideration. All applications for loans should be made before July 1 preceding the academic year in which the student plans to matriculate.

All applications for loans should be made to the Student Loan Division, Allen Building, Duke University, Durham, N. C. 27706.

Courses and Subjects of Instruction

School of Forestry Courses

In the Summer Session

141. *Dendrology.* Nomenclature, classification, and identification of woody plants with special reference to species indigenous to southeastern United States and other important forest regions of temperate North America. Laboratory and field studies in the southern Appalachian Mountains, Piedmont Plateau, and South-Atlantic Coastal Plain. Prerequisite: One year of biology including botany. *Three weeks, eight hours a day beginning June 13, 1966. 3 s.h. (w)* Assistant Professor White

150. *Forest Surveying.* Application of plane surveying to forest problems including the use and adjustment of instruments; boundary, topographic and cover-type surveys; details of land ownership, title and transfer. Prerequisite: trigonometry; engineering graphics desirable. *Three weeks, eight hours a day beginning July 4, 1966. 3 s.h. (w)* Professor Chaiken

152. *Timber Harvesting Techniques.* Techniques and trends in the harvesting of forest products in the Southeast; field observation and critique of harvesting operations; tree and log grading for forest products.

One week, eight hours a day beginning July 25, 1966. 1 s.h. (w) Assistant Professor White

151. Forest Mensuration. Field studies in methods of measuring content and growth of trees and forest stands; practice of timber estimating, log scaling, use of mensurational instruments, and collection of basic data. *Four weeks, eight hours a day beginning August 1, 1966. 4 s.h. (w) Professor Osborne*

Regular Session Courses for Seniors and Graduates

201. Forest-Tree Physiology. The principal physiological processes of trees, including water relations, synthesis and use of foods, and growth phenomena. Prerequisites: Botany 1-2 or equivalent; one year of chemistry. 3 s.h. (fall). *Professor Kramer*

205. Forest-Tree Metabolism. Biochemical aspects of tree physiology and forest biology, with emphasis on primary assimilation processes, synthesis of major components and products of trees, and growth correlations. Prerequisites: Forestry 201 or equivalent; organic chemistry. 3 s.h. (spring). *Professor Barnes*

212. Harvesting and Utilization of Forests. Principles, procedures, and cost determinations in harvesting timber products with emphasis on managed forests in North America. Processing of wood as a raw material by important forest industries. 3 s.h. (spring). *Professor Wackerman*

216. Lumber Manufacture. Methods of processing logs for sawn products with emphasis on the principles involved in obtaining maximum volume and quality yield for large and small mills; trends in lumber consumption by regions; use of waste for by-products; the development of new lumber products; and industry problems. Prerequisite: Forestry 212 or equivalent. 3 s.h. (spring). *Professor Wackerman*

218. Harvesting and Forest Products Field Seminar. Field studies of the major regional forest products industries; observation and application of harvesting techniques. 1 s.h. (spring). *Assistant Professor White*

223. Forest Pathology. Principles of plant pathology with special emphasis on representative forest tree diseases; introduction to forest products pathology. Related field and laboratory studies of regional tree diseases and deterioration of wood products. Prerequisite: Botany 1-2, or equivalent. 3 s.h. (spring). *Associate Professor Stambaugh*

230. Forest Entomology. Principles of protecting forests from injurious insect infestations; characteristics and identification of insect-caused damage to trees and wood products; identification, biology, and control of the more important tree-infesting insect species. 3 s.h. (fall). *Professor Anderson*

232. Forest Products Entomology. Study of the characteristics and identification of various types of injury to wood products caused by insects and other wood-damaging animals; identification, biology, and

control of wood-damaging animals. Prerequisite: Forestry 230 or equivalent. 2 s.h. (spring.) *Professor Anderson*

243. Silvics. Ecological foundations of silviculture with special reference to forest site factors; influence of forests on their environment; growth and development of trees and stands; origin, development, and classification of forest communities; methods of studying forest environments. Desirable prerequisites: plant physiology, plant ecology, and Forestry 261, or equivalents. 3 s.h. (fall). *Associate Professor Woods*

244. Theory and Practice of Silviculture. Principles governing establishment, treatment, and control of forest stands; natural and artificial methods of reproduction, intermediate cuttings, and cultural operations with emphasis on the principal forest types of temperate North America. Field practice in silvicultural operations and study of managed stands. Prerequisite: Forestry 243 or equivalent. 3 s.h. (spring). *Assistant Professor White*

247. Biological Nucleonics. Fundamentals of nucleonics; instruction in biological uses of radioactive tracers; counting instruments and measurements; legal requirements. Prerequisites: consent of instructors; one year each of college biology, chemistry, and physics. 3 s.h. (spring). *Associate Professor Woods and Professor Fluke*

248. Forest Regeneration. Fundamentals and practices of regenerating forest stands. Genetic control through recently developed propagating techniques; seed handling in the field, and during preparation for use; techniques for large production tree nurseries; the use of heavy equipment, chemicals, and fire for site preparation and timber stand improvement; recent developments in direct seeding and planting. 3 s.h. (fall). *Associate Professor Woods*

250. Forest Biometry. Statistical methods essential to the collection, analysis, and interpretation of forest data; includes regression and correlation techniques, Chi-square tests of associations, and tests of significance; short-cut computational procedures. Special attention is devoted to the use of statistical techniques in forest administration and mensuration problems. 3 s.h. (spring). *Professor Osborne*

251. Sampling Methods in Forestry. Statistical background for solution of sampling problems with special references to sampling of forest and associated populations. Prerequisite: Forestry 151. 3 s.h. (fall). *Professor Osborne*

257. Design of Forestry Experiments and Analysis of Data. Role of experimental design in field and laboratory, and statistical analysis of data as aspects of the scientific method in forestry research. 5 s.h. (fall). *Assistant Professor Braaten*

258. Scientific Programming Procedures in the Management of a Forest or Forest Industry. An introduction to mathematical model formulation and techniques to aid management decisions in forest production, harvesting, and the manufacture of forest products. Includes techniques for al-

location of resources, production scheduling, inventory control, and equipment replacement planning. Consideration is given to both deterministic and nondeterministic situations. 3 s.h. (spring). *Professor Osborne*

261. Forest Soils. Origin, development, and classification of soils with special emphasis on those developed in humid climates; morphological, physical, and chemical properties of soils in relation to growth of trees; effect of forests on soils. Prerequisites: Chemistry 1 and 2, and Physics 1, or equivalent; physical geology, mineralogy, petrology, and analytical chemistry are also desirable. 3 s.h. (fall). *Professor Ralston*

270. Economics of Forestry. Development of the principles of economics useful in the analysis of the past, present, and prospective supply and demand situations for forestry goods and services; problems of the economics of the firm and industry basic and peculiar to forestry, with special attention to the time dimension of value; the role of forestry in the general economy including attention to relevant institutional factors. Prerequisite: at least one course in the principles of economics. 3 s.h. (fall). *Professor Yoho*

272. Marketing Forest Products. Methods of selling and distributing lumber, timber, and other important forest products in domestic and foreign trade; trade-association functions; regional competition for markets; and transportation problems. Prerequisites: Forestry 212 and 270 or equivalents. 2 s.h. (spring). *Professor Wackerman*

276. Forest Policy. Objective study and analysis of the development of public land and forestry policies in the United States, present policies of public and private forestry organizations, and current policy issues in the light of economic and other criteria. Prerequisite: Forestry 270. 3 s.h. (spring). *Professor Yoho*

281. Forest Management. Principles of organizing forest properties for systematic management, use of data obtained in surveys and inventories; principles of forest regulation, including a study of normal and actual forests, rotations, cutting cycles, and methods of regulating the cut in even-aged and all-aged forests for sustained yield; introduction to the preparation of preliminary forest management plans. Prerequisites: Forestry 150, 151, or equivalents. 3 s.h. (fall). *Professor Chaiken*

283. Forest Protection. Impact of destructive agencies upon forests; principles of combustion, fire behavior, danger measurement and suppression; use of fire in forest management. 3 s.h. (spring). *Professor Chaiken*

285. Forest-Game Management. Principles of management for the sustained production of desirable game and fur animals on forest land; characteristics and biology of important species. 2 s.h. (spring). *Professor Anderson*

286. Forest-Range Management. Principles of livestock management

by which sustained maximum use can be obtained from forest grazing lands. 2 s.h. (spring). *Professor Anderson*

289. Interpretation of Aerial Photographs. Principles of aerial photography and remote sensing as applied to forest administration, vegetation mapping, forest mensuration, and insect and disease surveys. Co-requisite: Forestry 281 or equivalent. 3 s.h. (fall). *Professor Chaiken*

290. Wood Anatomy. Study of the physical features and the gross and minute structural characteristics of wood leading to the identification of the commercial woods of the United States, and the important tropical woods used in American wood-working industries. Prerequisites: one year of biology including botany; Forestry 141 or equivalent. 3 s.h. (spring). *Assistant Professor Sullivan*

291. Wood-Moisture Relations. Physical principles underlying the response of wood to moisture and its removal; the concept of equilibrium moisture content. Principles and methods involved in drying lumber and other wood products as a step in preparing them for use. Prerequisites: Forestry 212, and 290 or equivalents. 2 s.h. (fall). *Professor Wackerman*

292. Microtechnique of Woody Tissue. Preparation of wood for microscopic study including sectioning, staining, and mounting techniques; elementary photomicrography. Prerequisite: Forestry 290 or equivalent. 3 s.h. (fall). *Professor Harrar*

293. Wood Preservation. Principles, methods, and materials used in treating wood to increase its durability, service-life, and fire resistance. Prerequisites: Forestry 212 and 290, or equivalents. 2 s.h. (fall). *Professor Wackerman*

295. Surface Generation in Wood. Directed energy systems; physics of edges; details of wood surface generating machinery; surface generation in relation to wood anatomy; physical measurement of wood surfaces. Prerequisites: For. 290 or equivalent, calculus. 2 s.h. (fall). *Assistant Professor Sullivan*

296. Chemistry of Wood. Nuclear, atomic and molecular force systems; chemical composition and distribution of chemical components in wood; interaction of wood and moisture; macro-chemical reactions of wood and other cellulosic systems including degradation reactions. Prerequisites: Forestry 290 or equivalent, calculus, organic chemistry. 3 s.h. (fall). *Assistant Professor Sullivan*

297. Wood Physics (Mechanics). A study of the reaction of wood to mechanical forces; the derivation of working properties and their variance; experimental and standard testing procedures; introduction to theories of elasticity and plasticity; theories of failure; anatomical and moisture effects. Prerequisites: Forestry 290 or equivalent, calculus, college physics, statistics. 3 s.h. (fall). *Assistant Professor Sullivan*

201A. to 297A. Special Studies in Forestry. Work on the same level as

the foregoing Senior-Graduate courses to meet the needs of individual students. Credit and hours to be arranged. *The Staff*

For Graduates

301. (fall), 302 (spring). *Advanced Studies in Forestry*. Credits to be arranged. To meet individual needs of graduate students in the following branches of forestry:

- A. *Silvics*. Prerequisites: Forestry 141, 243, and 244 or equivalents. *Associate Professor Woods*
- B. *Forest Soils*. Prerequisite: Forestry 261 or equivalent. *Professor Ralston*
- C. *Silviculture*. Prerequisites: Forestry 243 and 244, or equivalents. *Assistant Professor White*
- D. *Forest Management*. Prerequisite: Forestry 281 or equivalent. *Professor Chaiken*
- E. *Forest Economics*. Prerequisite: Forestry 270 or equivalent. *Professor Yoho*
- F. *Properties of Wood*. Prerequisites: Forestry 141, and 290 or equivalents. *Professor Harrar and Assistant Professor Sullivan*
- G. *Forest Mensuration and Biometry*. Prerequisites: Forestry 250, and 352 or equivalents. *Professor Osborne and Assistant Professor Braaten*
- H. *Forest Entomology*. Prerequisite: Forestry 230 or equivalent. *Professor Anderson*
- I. *Forest Utilization*. Prerequisite: Forestry 212 or equivalent. *Professor Wackerman*
- J. *Dendrology*. Prerequisite: Forestry 141 or equivalent. *Professor Harrar and Assistant Professor White*
- K. *Forest-Tree Physiology*. Prerequisites: Plant physiology, plant ecology, and silvics. *Professor Kramer*
- L. *Forest Pathology*. Prerequisites: Plant physiology and Forestry 223 or equivalents. *Associate Professor Stambaugh*
- M. *Forest Climatology and Hydrology*. Prerequisites: Forestry 341, 342, or equivalents. *Assistant Professor Knoerr*
- N. *Forest Biochemistry*. Prerequisites: Plant physiology, organic chemistry. *Professor Barnes*

312. *Cost and Quality Controls in Forest Utilization*. Principles and methods of obtaining greatest efficiency of operations and maximum product value in harvesting and processing forest products; factors governing the relation of tree size to net stumpage values; and the application of these principles and methods in the solution of actual case problems. Prerequisites: Forestry 212 and 270 or equivalents. 3 s.h. (spring). *Professor Wackerman*

321. *Research Techniques in Forest Pathology.* Fundamental phytopathological methods employed in field and laboratory investigations of tree disease pathogens. Literature review and discussion of current developments. Prerequisite: Forestry 223, or equivalent. 3 s.h. (fall). *Associate Professor Stambaugh*

322. *Microbiology of Forest Soils.* Qualitative and quantitative characterization of the microbial populations of forest soils with emphasis on rhizosphere interactions in root pathogenesis and mycorrhizal development; epidemiology of root diseases of trees; principles of control. Prerequisites: Forestry 223, and mycology or bacteriology is recommended. 3 s.h. (spring). *Associate Professor Stambaugh*

331. *Toxicology of Insecticides.* Study of the physical, chemical and biological properties of materials used to destroy insects. Formulation, toxicology and insect physiology as related to insecticide action are emphasized. Prerequisite: one course in entomology; organic chemistry is recommended. 3 s.h. (spring). *Professor Anderson*

332. *Ecology of Forest Insects.* Study of the environmental factors as they influence insect population development. Both the physical and the biotic aspects are considered on the basis of field and laboratory experimental methods. Prerequisite: Forestry 230 or equivalent. 3 s.h. (fall). *Professor Anderson*

333. *Morphology and Taxonomy of Forest Insects.* Principles of insect structure, classification and nomenclature; laboratory work concentrated on the collection, preservation and identification of both the adult and immature stages of various forest insects. Prerequisite: Forestry 230 or equivalent. 3 s.h. (fall). *Professor Anderson*

341. *Forest Meteorology.* The science of meteorology, including microclimatology, as it is related to forest biology and hydrology; emphasis is on physical laws governing exchange of heat and moisture in the climatic environment. Prerequisite: One year of college physics; calculus desirable. 3 s.h. (fall). *Assistant Professor Knoerr*

342. *Forest Hydrology.* The influence of forests and other vegetation on local climate, the hydrologic cycle, and soil stability; relationships to water yield, floods, and erosion. Prerequisite: One year of college physics; calculus desirable. 3 s.h. (spring). *Assistant Professor Knoerr*

344. *Micrometeorology.* Physics of the earth's surface environment with emphasis on plant and animal microclimate; budgets of mass, momentum and energy; vertical structure of wind, temperature, and water vapor in relation to exchange processes within the biosphere; local circulation and eddy diffusion. Principles in micrometeorological measurement. Prerequisites: Forestry 341; calculus desirable. 3 s.h. (spring). *Assistant Professor Knoerr*

347, 348. *Seminar in Silvics.* Advanced topics in silvics are discussed and current research papers and reports are reviewed, analyzed, and

evaluated. Prerequisite: Forestry 243 or equivalent. 2 s.h. (fall and spring). *Associate Professor Woods*

352. Analysis of Forest Measurements. Empirical equations and curve fitting appropriate to forestry data; functional relationships among experimental responses; useful mathematical models for forestry populations; selected non-parametric analysis methods. Prerequisites: Forestry 250 or Mathematics 233 or equivalents. 3 s.h. (spring). *Assistant Professor Braaten*

353. Sampling and Experimental Design in Forestry. Theory and application of selected sampling designs to forestry populations. Includes multi-stage and multi-phase designs; acceptance and sequential sampling; regression, ratio, and double sampling; sampling with variable probability of selection. Construction and analysis of designs for forestry experiments. Prerequisites: Forestry 250 or Mathematics 230 or equivalents. 3 s.h. (fall). (Not offered 1966-67). *Professor Osborne*

357, 358. Research in Forestry. Credits to be arranged. Students who have had adequate training may do research under direction of members of the Faculty in the branches of forestry indicated under courses 301, 302 with the same prerequisites as thereunder noted; each branch to bear the same letter designation as under courses 301 and 302. (fall and spring). *Staff*

362. Forest Soil Physics. Analysis of the physical properties of soil related to the growth and development of forest trees. Consideration is given to the significance of soil moisture, temperature, aeration, and structural characteristics in the analysis of forest growth relationships. Prerequisite: Forestry 261. 3 s.h. (spring). Offered in alternate years with Forestry 366. (Not offered in 1966-67). *Professor Ralston*

364. Soil Classification and Mapping. Classification of soils as natural bodies. Mapping of soils, land use classes and forest site classes; field study will be made of soils in either the coastal plain or mountains. Prerequisite: Forestry 261. 3 s.h. (spring). *Professor Ralston*

366. Forest Soil Fertility. The relationships of soil fertility factors in the growth of forest trees. Emphasis placed on the analysis of soil factors related to the mineral nutrition of trees. Prerequisite: Forestry 261; analytical chemistry is recommended. 3 s.h. (spring). *Professor Ralston*

368. Field Seminars. Field studies, consultations, and visits to areas of interest during spring vacation period, or at other times, in the several branches of forestry listed under Forestry 301-302. Credits to be arranged. *The Staff*

378. Seminar in Forest Economics. Examination and discussion of the application of economic concepts in forestry, the potential contribution of economic analysis to private and public forest management; current research in forest economics. Prerequisites: Forestry 270 and 379 or consent of the instructor; advanced courses in economics and economic theory are desirable. 2 s.h. (spring). *Professor Yoho*

379. *Economic Analysis in Forestry.* A critical exploration of static and dynamic economic theory including procedures in activity analysis applicable to forestry problems of resource allocation and production combinations, production location and timing; cost structure and asset control; uncertainty and expectations. Special attention to problems in formulating economic projections and forecasts relevant to forestry. Prerequisite: Forestry 270 or consent of instructor. 3 s.h. (fall). *Professor Yoho*

382. *Legal Aspects of Forestry.* A seminar discussion of certain state and federal laws pertinent to the management of forests: land ownership, trespass, public liability, timber contracts, labor relations, use of pesticides. 1 s.h. (spring). *Professor Chaiken*

386. *Seminar in Forest Management.* Examination and analysis of techniques employed in the management of industrial and public forests, particularly in the South; discussion of problems of large scale intensive forest management. Prerequisites: Forestry 244, 281, and 379 or equivalent. 1 s.h. (spring). *Professor Chaiken*

390. *Wood-Liquid Surface Interactions.* Free surface energy of liquids and solids; theory of adhesion; adhesion for wood substrates; physical and chemical description of adhesives and adhesive joints; wood coatings; physical and chemical properties of surface coating materials. Prerequisite: Forestry 296. 3 s.h. (spring). *Assistant Professor Sullivan*

392. *Advanced Wood Physics.* Theories of elasticity and plasticity; mechanical damping; piezoelectric properties; structure of crystals; fatigue failure. Prerequisites: Forestry 297, Forestry 296, Experimental Design. 3 s.h. (spring). *Assistant Professor Sullivan*

398. *Tropical Woods.* A study of the properties of various groups of tropical woods with particular emphasis upon those used in marine construction, and for lumber, plywood and furniture. Prerequisite: Forestry 290 or equivalent. 2 s.h. (spring). *Professor Harrar*

399. *Seminar in Wood Science and Forest Products.* Application of scientific disciplines to product research and development; wood science in industry. 1 s.h. (spring). *Professor Harrar and Assistant Professor Sullivan*

Other Related Courses

A student in the School of Forestry, may, with the approval of the faculty of the School of Forestry and the Director of Graduate studies of the department concerned, include any of the following courses offered in the Graduate School of Arts and Sciences for which he has had adequate preparation. The student is referred to the *Bulletin* of the Graduate School of Arts and Sciences for the complete descriptive content of each course.

Biochemistry and Nutrition

Assistant Professor Irwin Fridouich, *Director of Graduate Studies*

S.H.

201. Introductory Biochemistry	4
203. Chemistry of Natural Products	2
206. Laboratory Methods in Biochemistry	2
301. Energy Metabolism	3
302. Nitrogen Metabolism	2
304. Proteins and Enzymes	4

Botany

Professor Aubrey W. Naylor, *Director of Graduate Studies*

S.H.

202. Genetics	4
203. Plant Cytology	4
205. Anatomy	4
221. Mycology	4
240. Plant Evolution	3
252. Plant Metabolism	4
254. Plant-Water Relations	3
255. Plant Systematics	4
256. Community Analysis and Classification	3
257. Principles of Plant Distribution	3
258. Physiology of Growth and Development	4
259. The Environment	3
305. Vegetation of North America	3

Chemistry

Associate Professor L. D. Quin, *Director of Graduate Studies*

S.H.

206. Elements of Theoretical Chemistry	4
215. Advanced Inorganic Chemistry	3
216. Nuclear Chemistry	2
234. Chemical Instrumentation	2
251. Qualitative Organic Analysis	2 or 3
252. Advanced Organic Preparation	2
303. Thermodynamics	3
304. Physical Chemistry of Reactions	3
342. Advanced Organic Chemistry	2
350. Organic Reactions	2
352. Mechanisms of Organic Reactions	1
360. Polymer Chemistry	2

Civil Engineering

Professor E. I. Brown, *Director of Graduate Studies*

	S.H.
CE 201. Advanced Mechanics and Materials	3
CE 202. Experimental Stress Analysis	3
CE 231. Structural Engineering	3

Economics and Business Administration

Associate Professor W. T. Yohe, *Director of Graduate Studies*

	S.H.
201. Senior Seminar in Economics	3
204. Advanced Money and Banking	3
218. Business Cycles	3
219. Economic Problems of Underdeveloped Areas	3
231. Economic History of Europe	3
233. State and Local Finance	3
237-238. Statistical Methods	6
249. Product Markets	3
262. Trade Unionism and Collective Bargaining	3
268. Competition and Monopoly	3
273-274. Auditing, Theory and Practice	6
275-276. Advanced Industrial Accounting and Management	6
277. Income Tax Accounting	3
278. Advanced Problems in Income Taxation	3
279. Budgeting and Control	3
287. Public Finance	3
291. Business Policy	3
293. Economic Systems	3
294. Economic Functions of the State	3
295-296. Advanced Accounting Seminar—Theory and Practice	6
301. Economic Analysis	3
304-305. Seminar—Money and Banking	6
386. Seminar—Latin American Economic Problems	3
388. Seminar—Industrial Organization	3
307-308. Quantitative Analysis	6
311-312. History of Political Economy	6
313-314. Seminar—Economic Theory	6
315. Seminar—Economic Systems	3
316. Seminar—Economic Functions of the State	3
317. Seminar—Demographic, Population, and Resource Problems....	3
319. Seminar—Theory and the Problems of Economic Growth and Change	3
320. Seminar—Trade Cycles, Employment, and Income Theory	3

329. Federal Finance	3
330. Seminar—Public Finance	3
331. Seminar—Economic History	3
340. National Income	3
355. Seminar—Labor Economics	3
358. Seminar—Labor Market and Related Analysis	3
366. Seminar—International Economics	3
366. Seminar—Problems in International Trade and Finance	3
389. Seminar—Industrial and Governmental Problems	3
401. Seminar—British Commonwealth	3

Electrical Engineering

Associate Professor Harry A. Owen, Jr., *Director of Graduate Studies*

S.H.

EE 201. Energy Systems	3
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Mathematics

Associate Professor S. L. Warner, *Director of Graduate Studies*

S.H.

221. Digital Computer	3
222. Introduction to Numerical Analysis	3
233. Statistical Methods	3
234. Sampling Designs	3
244. Design of Experiments	3
283. Probability for Engineers	3
285. Applied Mathematical Methods I	3
286. Applied Mathematical Methods II	3
291-292. Theory of Functions	6
325-326. Real Variable	6

Mechanical Engineering

Professor V. L. Kenyon, Jr., *Director of Graduate Studies*

S.H.

ME 201. Theoretical and Applied Mechanics	3
ME 202. Theoretical Thermodynamics	3
ME 222. Analysis of Heat Transfer	3

Philosophy

Professor Paul Welsh, *Director of Graduate Studies*

S.H.

241. Logic	3
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Physics

Professor E. G. Greuling, *Director of Graduate Studies*

	S.H.
201-202. Mechanics	6
213-214. Contemporary Physics	6
217-218. Advanced Physics Laboratory	2-6
303-304. Thermodynamics and Statistical Mechanics	6

Political Science

Associate Professor J. H. Proctor, *Director of Graduate Studies*

	S.H.
207. American Constitutional Law and Theory	3
241. Administrative Management	3

Zoology

Associate Professor D. A. Livingstone, *Director of Graduate Studies*

	S.H.
203. Ecology	4
222. Entomology	4
238. Systematic Zoology	4
245. Radiation Biology	3 or 4
246. Molecular Biology	3 or 4
271. Cellular Physiology	4
274. Invertebrate Zoology	4
276. Protozoology	4
278. Invertebrate embryology	4

Cooperative Plan of Study with Selected Colleges and Universities

Since its inception the Duke School of Forestry has had the cooperation of Trinity College (the men's undergraduate college of arts and sciences of Duke University) in preparing students for professional careers in forestry. Under the plan, a student devotes his first three years to a coordinated and carefully integrated program of study in the basic arts and sciences in Trinity College. The summer between his junior and senior year and the two following school years are spent in the School of Forestry. Upon the successful completion of this five-year course of study, a student will have earned the Bachelor of Science degree from Trinity College and the professional Master of Forestry degree from the Duke School of Forestry.

Based upon the experience and success of this cooperative program with Trinity College, the School of Forestry in 1952 initiated similar programs of collaboration with a selected group of colleges and universities located throughout the United States. These programs offer students the numerous advantages of a broad background in liberal arts and sciences as preparation for later professional training. A student intent upon following such a course of study should make application to one of the colleges listed on pages 48-51. Admission requirements and other information pertinent to matriculation may be obtained from each of these institutions.

Not later than the end of the first semester of the third year in the college or university of his choice, the student may make formal application for admission to the Duke School of Forestry. To qualify for admission under these programs, a student must have followed a planned course of study arranged in consultation with his advisor, must have the official recommendation of his college, and must meet the minimum requirements for admission to the Duke School of Forestry.

Institutions Cooperating with the School of Forestry in the Academic-Forestry Program

Alabama

Howard College Birmingham 35209

Colorado

Colorado College Colorado Springs 80903

Florida

Florida Southern College Lakeland 33802

Rollins College Winter Park 32791

Stetson University, College of Liberal Arts Deland 32720

Georgia

Mercer University Macon 31207

Illinois

Illinois Wesleyan University, College of Liberal Arts Bloomington
61710

Indiana

Butler University, College of Liberal Arts and Sciences Indianapolis
46207

Indiana Central College Indianapolis 46227

Iowa

Iowa Wesleyan College Mount Pleasant 52641

Kansas

Baker University Baldwin 66006

Kentucky

Kentucky, University of, College of Arts and Sciences Lexington
40506

Louisiana

Centenary College of Louisiana Shreveport 71104

Maryland

Western Maryland College Westminster 21158

Michigan

Albion College Albion 49224

Mississippi

Millsaps College Jackson 39210

Missouri

William Jewell College Liberty 64068

Nebraska

Loane College Crete 68333

New Jersey

Drew University, College of Liberal Arts Madison 07940

New York

Hofstra College Hempstead, Long Island 11550

North Carolina

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Duke University, Trinity College Durham 27706
Guilford College Guilford College 27410
High Point College High Point 27262
Wake Forest College Winston-Salem 27106

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 Denison University, A College of Liberal Arts and Sciences Gran-
 ville 43023
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 Marietta College Marietta 45750
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 Muhlenberg College Allentown 18104
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Tennessee

Carson-Newman College Jefferson City 37760
 Chattanooga, University of, College of Liberal Arts Chattanooga
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 Tennessee Wesleyan College Athens 37303
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Texas

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Virginia

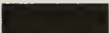
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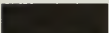
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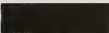
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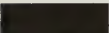
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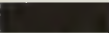
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 The Undergraduate Colleges

 The Divinity School

 The College of Engineering

 The School of Forestry



BULLETIN OF DUKE UNIVERSITY

General Catalogue

1966

Part Two

Annual Bulletins

For *Bulletin of Information for Prospective Students*, apply to The Registrar, Duke University, Durham, N. C.

For *Bulletin of Undergraduate Instruction*, apply to The Registrar, Duke University, Durham, N. C.

For *Bulletin of The College of Engineering*, apply to The Registrar, Duke University, Durham, N. C.

For *Bulletin of The Divinity School*, apply to The Dean of the Divinity School, Duke University, Durham, N. C.

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For *Bulletin of The School of Law*, apply to The Dean of the School of Law, Duke University, Durham, N. C.

For *Bulletin of The School of Medicine*, apply to The Dean of the School of Medicine, Duke University, Durham, N. C.

For *Bulletin of The School of Nursing*, apply to The Dean of the School of Nursing, Duke University, Durham, N. C.

For *Bulletin of The Summer Session*, apply to The Director of the Summer Session, Duke University, Durham, N. C.

Published by Duke University monthly except in July, August, September, and December. Entered as second-class matter March 25, 1929, at the Post Office of Durham, North Carolina, under the Act of August 24, 1912.

Statement of Ownership, Management, and Circulation

Date of Filing: June, 1966

Title of Publication: Bulletin of Duke University.

Frequency of Issue: 13 per calendar year.

Location of Known Office of Publication: 111 Allen Building, Duke University, Durham, North Carolina.

Location of the Headquarters or General Business Offices of the Publishers: Same.

Name and Address of Publisher: Duke University, Durham, North Carolina.

Name and Address of Editor: Dr. Richard L. Tuthill, Registrar, Duke University, Durham, North Carolina.

Name and Address of Managing Editor: Mrs. Sandra Simmons, Assistant to the Registrar, Duke University, Durham, North Carolina.

Owner: Duke University, Durham, North Carolina.

Known Bondholders, Mortgages, and Other Security Holders: None.
(Act of October, 1962: Section 4369. Title 39 U.S. Code)

BULLETIN OF DUKE UNIVERSITY

General Catalogue

1966

Part Two

Durham, North Carolina 1966



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General Regulations Governing Graduate Study

Admission

Prerequisites

A student seeking admission to the Graduate School of Arts and Sciences of Duke University must have received an A.B. or B.S. degree (or the equivalent in the case of foreign students) from an accredited institution. His undergraduate program should be well rounded and of such quality as to give positive evidence of capacity for graduate study. Normally he should have majored in the area of his intended graduate study. Many departments (see Courses of Instruction, p. 51) list specific prerequisites. Students are urged to anticipate at least one of the language requirements (see pp. 9-11).

Students Requiring Admission

Admission is required of (1) all students who intend to pursue study toward a degree offered by the Graduate School, (2) all other students who desire credit for whatever purpose for graduate courses—except students who register as Special Students in the Summer Session. Students

who have discontinued a program of study after earning a master's degree here must by letter request permission of the Dean to undertake a doctoral program.

Procedure for All Applicants

A student seeking admission to the Graduate School should request the Dean of the Graduate School to send an application blank. This he should fill out completely and return promptly. In addition he should provide the following supporting documents: (1) two copies of a transcript or transcripts of all his undergraduate and graduate work mailed directly by the registrar to the Dean; (2) as soon as possible, supplementary transcripts showing completion of work in progress when the earlier transcript was made; (3) three letters of recommendation written on the forms provided by persons best qualified to judge him as a prospective graduate student and mailed directly to the Dean; and (4) scores on the Graduate Record Examination or Miller Analogies Test as indicated.

All applicants except foreign students applying from outside the United States and non-degree students must include an application fee of \$5.00 in check or money order payable to Duke University.

Additional Procedure for Foreign Students

Fully qualified students from outside the United States are welcomed in the Graduate School to take courses and in many instances to study toward a degree. In applying for admission the foreign student should, in addition to the information required of all students, submit with his application (1) if his native language is not English, certification of ability to use English such as scores on tests provided by the Educational Testing Service (TOEFL), the University of Michigan Language Institute, or the American University Language Center, (2) a statement certified by a responsible person that his finances are sufficient to maintain him during his stay at Duke University, and (3) a statement by a qualified medical doctor describing any emotional or physical illness the applicant has had during the previous five years.

All foreign students whose native language is not English will be examined during their first registration period for competence in the use of oral and written English. Until competence is determined, admission and arrangements for an award involving teaching must remain provisional. Students found to lack the necessary competence will be required to enroll in the non-credit course English for Foreign Students and to reduce their course or research program three units if necessary. Passing this examination or the course, if it is required, will not meet degree requirements for a foreign language. (See page 11.)

Graduate Record Examination and Miller Analogies Test

As additional evidence of capability, scores on the Graduate Record Examination, particularly the Aptitude Test, and on the Miller Analogies Test are strongly recommended in all departments and must be submitted if either test has been taken. Scores on the Graduate Record Examination may be requested of any applicant whose record is marginal and must be submitted by all applicants for a fellowship. Departments that require scores of all applicants are listed below:

Departments that Require GRE and/or MAT

Departments	Graduate Record Examination		Miller Analogies
	Aptitude	Advanced	
Anatomy	×	×	
Biochemistry	×	×	
Botany	×	×	
Economics	×	×	
English	×	×	
Forestry	×		
Geology	×		
German	×		
History	×		
Microbiology	×	×	
Mathematics	×		
Pathology	× ¹		
Physiology	×		
Psychology	×	×	×
Religion	×		
Romance Languages	×	×	
Sociology	×	×	
Zoology	×	×	
Philosophy	×		× ²

¹ If the candidate does not already hold a M.D. or D.V.M. degree he will be required to take the GRE Aptitude Test.

² Either GRE or MAT.

(Information on times and places of Graduate Record Examinations can be provided at the applicant's college or by the Educational Testing Service, 20 Nassau Street, Princeton, New Jersey.)

Closing Dates for Applications

Because applications cannot be reviewed until all required supporting documents are filed, applications should be submitted at least *two weeks* before the closing dates listed below:

- Fall semester, admission and award.....February 15
- Fall semester, admission only.....August 1
- Spring semester, admission only.....January 1

Summer Session,* First Term.....	May 13
Summer Session,* Second Term.....	June 21

* Students seeking admission to the Graduate School for study in the Summer Session should make application to the Dean of the Graduate School as well as to the Director of the Summer Session.

It is the applicant's responsibility to make certain that his application is completed and in order before the dates specified.

Notification and Status

When admission is approved, the student will receive a letter of admission and an acceptance form. The process of admission is not complete until the statement of acceptance has been returned.

Applicants who are admitted will be offered full admission, provisional admission, or non-degree admission. *Provisional admission* is offered to students who (1) appear to warrant admission but who do not fully comply with admission requirements, for a trial period of one semester or a minimum of 12 hours of course work, or (2) are admissible except that the application lacks a letter of recommendation, a supplementary transcript, required test scores, or some other required information. *Non-degree admission* is offered to students who (1) have no intention of taking an advanced degree at Duke University but wish to take courses for accreditation, for transfer to other institutions, or for other purposes, (2) do not fully meet admission requirements but wish to further their academic interests, and (3) who apply late and must register before the application can be fully considered. Graduate credit earned under *provisional status* may be applied toward an advanced degree at Duke University if and when upon review the student is granted full admission; graduate credit earned under *non-degree* status may not be applied toward an advanced degree at Duke University. Late applicants [(3) above] will be granted full admission if admission can be completed within two weeks of registration.

Registration

Who Must Register

(1) All students who enter course work or residence for credit; (2) all students who have completed minimum requirements for an advanced degree, but continue to use the facilities of the University in their research; (3) all students in *in absentia* status; (4) all students who wish merely to audit a course or courses.

Registration

After the applicant has received notification of his admission to the Graduate School and has returned his statement of acceptance of admission, he may present himself for registration. During the registration periods, announced in the *Bulletin*, he first confers with the Director of Graduate Studies of his major department, who prepares and signs a course card, listing the course work to be taken during the semester. The student then presents this course card to registration officials, who enroll him officially in his courses. After his first registration period as a current student he will pre-register at the stated times for pre-registration. Failure to pre-register incurs the penalty for late registration. *Former students* who intend to register to resume a degree program must give the Department and the Dean notice of this intention two months before registration.

Late Registration. All students are expected to register or pre-register at the times stated in the *Bulletin*. Those registering late, including those who are obliged to register *in absentia*, are subject to a *late registration fee* of \$5.00.

Change of Registration. During the academic year within a period of *fourteen days* from the registration date students may change registration with the approval of the Director of Graduate Studies, if no reduction of fee is involved, and with the approval of the Dean if reduction of fee is involved. Thereafter during the first thirty days from the registration date the only permissible change is dropping course-seminar registration and adding equivalent units of research, with the approval of the Director of Graduate Studies, the instructor of the course, and the Dean.

Normal Registration

A graduate student is designated as fully registered when he registers for the maximum credit his program requires. Required registration is set in consideration of the student's obligation to teach or assist and the stage he has reached in completion of degree requirements. In the *academic year* normal registration for the resident student who does not hold an appointment as part-time instructor or assistant or does not engage in part-time work is 15 units a semester or 30 units an academic year. The normal registration for the student who holds such an appointment or undertakes such work is either 12 units or a minimum of 9 depending upon the number of hours a week he is required to devote to such duties.

The resident student in a terminal master's program which requires no thesis carries normal registration until he has met all degree requirements. If a thesis is required and the student has met all requirements except for submitting his thesis, he registers for 3 units a semester while in residence or, if he elects to go out of residence, for 1 unit *in absentia* each semester until the thesis is accepted.

The resident student engaged in a master's program which is not terminal but preparatory to a doctoral program registers as though he were a doctoral student.

The resident student in a doctoral program carries normal registration through the semester in which he passes the preliminary examination. If he remains in residence, he continues to register for a minimum of 3 units a semester until the dissertation is accepted. If, before or after passing the preliminary examination, he elects to go out of residence, he registers for 1 unit a semester *in absentia* in order to keep his program active.

It is necessary to be a fully registered student according to the regulations listed above (except when registered *in absentia*) in order to establish eligibility for library carrel and laboratory space, for student housing, for University and some outside loans, for Student Health service including the voluntary Walker plan coverage, and for reporting status for military duty.

The registration of 1 unit a semester *in absentia* provides occasional consultation with the thesis or dissertation supervisor. It may be waived for military duty or serious problems of health.

In the *Summer Session* 6 units a term is maximum registration. Students resident in the academic year who wish to continue study and use of University facilities including Summer Session Student Health during the summer must register for 1 unit in the first Summer Session term. This registration provides use of these facilities for both terms.

Grades, Hours, and Credits

Although ideally graduate study is principally individual reading, research, and laboratory experimentation under guidance, academic progress in the United States is generally measured and recorded in terms of course hours and credits. The term *residence* designates full-time study and research in close proximity to facilities provided for both as opposed to part-time study incidental to a full-time occupation. Here required *residence* of one year is defined as two successive academic semesters of not less than nine units registration each semester. Credit for courses and seminars, research, and residence, and corresponding tuition and fees are stated in terms of units. According to conventional measurement one unit is equivalent to one semester hour.

Credits Earned Outside This Graduate School

(1) *Graduate Credit Earned before the A.B. Degree Is Granted.* Ordinarily no credit will be allowed for graduate courses earned before a student has been awarded his A.B. or B.S. degree. However, an undergraduate student at Duke University who, at the beginning of his final

semester, lacks no more than 9 semester hours of fulfilling the requirements for the A.B. or B.S. degree, may obtain permission from the Dean of the Graduate School to enroll for graduate courses sufficient to bring his total program to fifteen hours a week. Such graduate courses will be credited toward the A.M., M.S., M.Ed., or M.A.T. degree, provided that the student meets the requirements for admission to the Graduate School, and that he is duly registered in the Graduate School at the beginning of the final semester.

Duke undergraduates in the Honors-Masters program provisionally may be granted this type of admission at the beginning of their seventh semester provided that at the beginning of their final semester they will meet the requirement stated above.

(2) *Transfer of Graduate Credits.* Credit for graduate course work earned at another institution will be determined only after a student has spent one semester at Duke University. After completing his first semester, the student through his Director of Graduate Studies should file a request that his credits be reviewed and a decision be made.

(3) *Graduate Credit for Courses Taken in the School of Law.* Upon the recommendation of the Director of Graduate Studies, and upon the approval of the Dean of the Graduate School, students in the social sciences may take certain courses in the School of Law for graduate credit. In some instances courses in the School of Law may be considered as fulfilling a student's requirements for a minor. To register for such courses, the student should present a letter from his Director of Graduate Studies to the Dean of the School of Law requesting permission to register for certain specified courses.

(4) *Reciprocal Agreement with the Consolidated University of North Carolina.* Under a plan of co-operation between the University of North Carolina and Duke University, students regularly enrolled in the Graduate Schools of the University during the regular academic year, and paying full fees to that institution, may be admitted to a maximum of two courses per semester in the Graduate School of Duke University upon payment of a nominal registration fee of two dollars and of any other special fees regularly required of all students. Under the same arrangements, students in the Graduate School of Duke University may be admitted to course work at the University of North Carolina. A similar arrangement is effective in the Summer Session. (See the *Summer Session Bulletin*.)

Grades

Grades in the Graduate School are as follows: *E*, *G*, *S*, *F*, and *I*. *E* (exceptional) is the highest mark. *G* (good) and *S* (satisfactory) are the remaining passing marks. *F* (failing) is below passing, and *I* (incomplete) indicates that some portion of the student's work is lacking, *for an acceptable reason*, at the time the grades are reported. The instructor who gives

an *I* for a course specifies the date by which the student must have made up the deficiency, in no case more than one calendar year from the date the course ended. If the course is not completed, the grade of *F* is entered upon the student's record unless his appeal to the Dean for the grade *No Credit* is approved. The grade of *Z* indicates satisfactory progress at the end of the first semester of a two-semester course. It will be changed to whatever grade is appropriate upon the completion of the course. A grade of *F* in a major course normally occasions withdrawal from a degree program not later than the end of the ensuing semester or term; a grade of *F* in a minor course occasions academic probation.

Courses Primarily for Undergraduates

Students granted provisional admission and others whose preparation is found deficient may on occasion be required as part of their program to take undergraduate courses as prerequisites to continued graduate study. Undergraduate courses thus taken and others elected by the student will carry no graduate credit.

In exceptional cases, 100-level courses *outside the major department* may be taken for graduate credit to a maximum of two one-semester courses or one year-course not exceeding a total of 8 units, when approved by the Directors of Graduate Studies in the major department and in the department in which the course is listed and by the supervisor of the program.

Withdrawal and Interruption of Program

From a Course. For permissible changes during the first thirty days after the registration date, see Change of Registration, page 5. If a course is dropped without the necessary approval, the permanent record will list the course as *Dropped Unofficially, F*. If a course is dropped after the thirty-day period, the status of the student at the time of withdrawal from the course will be determined and be indicated on the permanent record as *Withdrew Passing (W.P.)* or *Withdrew Failing (W.F.)*.

From the Graduate School. The University reserves the right, and matriculation by the student is a concession of this right, to request the withdrawal of any student whose conduct at any time is not satisfactory to the University, even though no specific charge be made against the student. If a student wishes for any reason to withdraw from the Graduate School, he should notify both the Director of Graduate Studies in his major department and the Dean of the Graduate School prior to the date of his expected withdrawal. (For refunds upon withdrawal, see above, p. 5.) For withdrawal occasioned by academic failure see above.

Students who find it necessary to interrupt their program of study for a period longer than a summer vacation should, before departure, leave with the Graduate Office a statement of the reason for interruption, mail-

ing address, and expected date of return. If they are subject to registration *in absentia*, they should arrange for such registration before departure.

A foreign student who after successfully completing a minimum of one semester's graduate study must withdraw for the purpose of returning home before the completion of a graduate program may with the approval of his major department request the Dean to issue him a Certificate of Graduate Study.

Transcript

A student who wishes to transfer his credits from Duke University to another institution is entitled to one free transcript of his record. A fee of one dollar, payable in advance, is charged for each additional copy. Requests are directed to the Central Records Office.

Size of Classes

Classes which carry graduate credit are limited in size to thirty students. In exceptional cases this regulation may be modified, but only by permission of the Executive Committee of the Graduate School Faculty on the recommendation of the department concerned. When courses numbered 200 or 299 carry graduate credit, they may include no more than three juniors and such juniors must, at the time of registration, have an over-all B average.

Language Requirements

Because a requirement for the A.M. degree is mastery of one acceptable foreign language, and for the Ph.D. is mastery of two, the prospective graduate student should attain mastery of at least one acceptable foreign language and preferably two before applying for admission. The facilities for graduate study are highly specialized and costly. The student who must lay them aside to acquire what he could have learned as an undergraduate is wasting his time.

To prevent delay in meeting this requirement, students whose programs call for mastery of French, Spanish, or German and who have studied the language must take the objective screening examination at their first registration period.

Acceptable Languages

The languages normally required are French, German, and Russian, but with the approval of the Dean of the Graduate School, a student may substitute for any one of these another language including an ancient

language in the doctoral program which has a definite relation to the candidate's program of work for the degree and for which an examination can be provided. Individual departments are free to specify which languages they require, and they may require more than two.

Meeting the Requirements

Language requirements may be met before, during, or after first registration here in the following ways:

Before First Registration. 1. *By Transcript.* With the permission of the Dean of the Graduate School and of the chairman of his program committee or of the Director of Graduate Studies, the *doctoral* student may file a transcript or other certification as evidence of having passed a comparable examination at another graduate institution. The limitations are that (1) only one of the two doctoral requirements may be met in this way, (2) the other institution offers a doctoral program in the student's major and that the examination would have met a doctoral requirement there, and (3) the examination was passed no more than five years before first registration here.

2. *By ETS Scores.* Educational Testing Service Graduate School Foreign Language tests in French, German, and Russian are offered at many centers including Duke University Counseling Center upon nationally uniform dates. Scores on these tests taken elsewhere not more than five years before first registration here may be offered to meet the master's degree requirement of one language or the doctoral requirement of two.

At First Registration. On Monday of the fall registration period and on the day before spring registration, objective reading, grammar, and vocabulary tests in French, German and Spanish are offered (see the Calendar for hour and place). Any entering student in the master's or doctoral program may take them. On the basis of his scores the student will be (1) certified as meeting requirements in these languages, (2) advised after review to present himself for the ETS tests (French, German) or the locally-prepared reading test in Spanish, or (3) advised to enroll in the special reading course (see below).

After First Registration. 1. Students who first registered in September 1964 and thereafter and who wish to be examined in French, German, or Russian will take the ETS tests. For Spanish they will take the locally-prepared reading test.

2. Students who began a program before September 1964 may take either the ETS test or the locally-prepared reading tests in French, German, Russian, Spanish, and, upon request, Italian.

Reading examinations in other languages must be individually arranged, after approval of the language by the Dean. Each ETS examination requires a fee of \$8. The student who requires a re-examination in the

locally prepared reading examination at scheduled times will be charged \$5 for each re-examination; if special times are necessary, the fee will be \$10. Examinations at special times cannot be offered in French and Spanish.

Special Reading Courses

Special courses designed to assist graduate students in acquiring a reading knowledge of French or German are offered for three hours a week, French during the fall semester, German during the spring semester and the Summer Session. A student who registers for either course must reduce his normal load of graduate courses by three units, with no reduction in fees. *No auditors* are permitted in these courses at any time. Undergraduates may not enroll during the academic year and may, with permission of the Dean of the Graduate School, in the Summer Session only if total registration permits.

Requirements for Foreign Students

Foreign students whose native language is not English are, during their first registration period, required to take a test for minimum competence in English (see p. 2). Such students, with the approval of the Director of Graduate Studies in their major department, may request permission of the Dean of the Graduate School to substitute English for the one foreign language required in the master's program or for one of the two in the doctoral program. If permission is granted, an additional reading test in English will be arranged.

Degrees Offered

The Graduate School of Arts and Sciences now offers the following degrees: Master of Arts (A.M.), Master of Science (M.S.), Master of Education (M.Ed.), Master of Arts in Teaching (M.A.T.), Master of Hospital Administration (M.H.A.), Doctor of Philosophy (Ph.D.), and the Doctor of Education (Ed.D.)

General Regulations Governing Master's Degrees

Residence Requirements

Candidates for all Master's degrees must spend, as a *minimum*, one full academic year, or its equivalent in Summer Session terms, in residence at Duke University. (See p. 6.) Those who wish to complete their degrees wholly in the Summer Session must be in residence for five terms. Often more time will prove necessary in either case, depending upon the nature of the student's research problem if a thesis is offered and upon the student himself.

A Master's degree *without thesis* requires a *minimum* of 30 units of graduate credit in course and seminar work properly distributed between major and minor fields.

A Master's degree *with thesis* requires a *minimum* of 30 units of graduate credit; not less than 24 units must be in course or seminar work properly distributed between major and minor fields; a minimum of 6

units must be in thesis research. If after completion of the 30-unit requirement the candidate remains in residence, he must register for a minimum of 3 units per semester.

A Master's candidate who in the academic year presents a thesis when not registered in residence will be charged 1 unit of residence for the semester in which the thesis is presented. (See above p. 6 and for fees for completing the degree during the Summer Session see the *Summer Session Bulletin*.)

Candidacy for the Master's Degree

To be considered as a candidate for a Master's degree (A.M., M.S., M.Ed., M.A.T., M.H.A.), the graduate student must (1) have made passing grades in all courses taken during the first period of residence (if he registers for fewer than 12 units of graduate courses during his first period of residence, he must make passing grades on the first 12 units of graduate courses), (2) have made a grade of *G* or *E* on at least 3 units of this work, and (3) have received the approval of the major department (or in the case of the M.A.T., of the supervisory committee).

Transfer of Graduate Credits

Under certain circumstances a maximum credit of 6 units may be allowed for graduate courses completed elsewhere. The acceptance of credit up to this amount, however, will not reduce the minimum of required registration at Duke University. (See above, p. 6.)

With the approval of both the student's major department and the Dean of the Graduate School, a student who is granted such transfer credit may be permitted to register for as much as 12 units of thesis research instead of the usual 6 units. Or he may be permitted to fill out his schedule with as much as 6 units of further undergraduate training or 6 units of required language courses on the undergraduate level. In no case will credit be allowed for extension or correspondence courses.

Time Limits for Completion of Master's Degrees

The candidate for the Master's degree who is in residence for consecutive academic years should complete all requirements for the degree *within two calendar years* from the date of his first registration in the Graduate School. *Any candidate* must complete all requirements *within six calendar years of his first registration*.

The Thesis

The thesis should demonstrate the student's ability to collect, arrange, interpret, and report pertinent material on his special research problem.

Although a publishable document is not required, the thesis must be written in an acceptable style and should exhibit the student's competence in scholarly procedures. Requirements of form are set forth in the Duke University *Manual of Style for Theses and Dissertations*, revised 1961, obtainable at the Duke University Book Store.

The Master of Arts

Prerequisites

As prerequisites to graduate study in his major subject, the student must have completed a *minimum* of 12 semester hours of approved college courses in that subject, and 12 additional semester hours in that subject or in related work. Since some departments require more than 12 semester hours, the student should read carefully the special requirements listed by his major department, which are included as headnotes to the course offerings in this bulletin.

Language Requirements

The candidate for the A.M. degree must have a reading knowledge of at least one modern foreign language. (The several departments reserve the right to specify which foreign languages are acceptable.) For methods of satisfying language requirements see p. 10. The language requirement must be satisfied before the Master's examination is taken.

Major and Minor Subject

In his graduate work the student must present acceptable grades for a minimum of 24 units of graduate courses. Of these, at least 12 units must be in the major subject. The student must take a minimum of 6 units in a minor subject or related fields which are approved by his major department. The remaining 6 units of the required 24 may be taken in either the major or minor department, or in another approved by the major department and by the Dean of the Graduate School. In addition he must present a thesis, which carries a credit of 6 units for which he must register. Thus, his earned credit for the degree totals a *minimum* of 30 units.

The Thesis

Filing the Thesis Title. At least one month before presenting the thesis, that is on or *before March 1 for a June degree* or on or *before July 1 for a September degree*, the student must file with the Dean of the Graduate School, on the official form, the title of the thesis and declaration of

intention to graduate. The title must have the approval of the Director of Graduate Studies in the major department, and of the thesis supervisor.

Preparing the Thesis. All basic requirements for preparing the thesis are described in the *Manual of Style for Theses and Dissertations*, revised 1961, obtained at the Duke University Book Store, West Campus. The quality of paper, form, and binding are prescribed in the *Manual*.

Submitting the Thesis. Four typewritten copies of the thesis bound in snap binders supplied by the Library must be submitted in approved form to the Dean of the Graduate School on or before May 1 for a June degree or August 15 for a September degree and at least three days before the scheduled date of the student's examination. The copies will then be distributed to the several members of the examining committee. Two copies for the Library will be bound by the Ruzicka Bindery, fee \$5.00 a volume. The student will state whether or not he wishes more than two so bound.

The Examining Committee and the Examination

The instructor who directs the thesis appoints an examining committee composed of the supervisor of the thesis and two other members of the Graduate Faculty, one of whom must be from a department other than that of the major. If the student has been permitted to take related work within the major department, the third member may represent the minor field within the department. This committee is submitted for approval to the Dean of the Graduate School when the thesis is first presented.

The candidate appears before this committee for an examination which lasts for about one and one-half hours. The subject matter covered in the examination is usually restricted to the thesis and to the major field.

If the candidate passes his examination, the examining committee certifies this fact by signing the title page of all copies of the thesis. The candidate then returns the original, the first carbon copy of the thesis, and any others he wishes bound by Ruzicka, to the Dean of the Graduate School, who deposits them in the University Library.

The Master of Science

Prerequisites

The degree of Master of Science is offered in the fields of Civil, Electrical, and Mechanical Engineering. As prerequisites to this degree the student must have earned a Bachelor's degree from an accredited engineering college and have completed a minimum of 12 semester hours work in the major field.

Foreign Language

There is no foreign language requirement for this degree.

Major and Minor Subjects

The work for the Master of Science degree is designed to provide a broad foundation in the fields of civil, electrical, and mechanical engineering. The student must present acceptable grades for a minimum of 24 units of graduate courses: at least 12 in course work in his major area of concentration in engineering (not necessarily confined to the offerings of the engineering department in which the student is registered); a minimum of 6 units in a minor subject outside of engineering which lends broad support to his program (usually in the mathematical or natural sciences); and the remaining 6 of the 24-unit course requirement in either the major or minor subject, or in an area approved by the major department and by the Dean of Engineering. In addition to the 24-unit course requirement, the student must present a thesis, which carries a credit of 6 units. Thus his earned credit for the degree totals a minimum of 30 units.

Regulations and Procedures

The regulations and procedures for the thesis and the provisions for examination and an examining committee are the same as those for the Master of Arts degree.

The Master of Education

Prerequisites

Before a student is admitted to graduate study for this degree, he should have completed, on the undergraduate level, a minimum of 18 semester hours of approved work in Education.

Before the degree is conferred the student must have had one year of actual teaching experience, or have met certification requirements by supervised student teaching in an accredited school. Such supervised student teaching may be at either the undergraduate or the graduate level.

Requirements for the Degree

The Master of Education degree may be earned either with or without the presentation of a thesis.

Without thesis. The required work includes a departmental major (Administration, Counseling, Elementary Education, Secondary Edu-

cation, or Teaching the Emotionally Disturbed) of at least 12 units, and a minor of at least 6 units outside the Department of Education. The remaining 12 units are elective within the area of Education and the minor field, but require the approval of the student's major adviser and the Director of Graduate Studies.

Toward the end of his residence the student must pass a comprehensive examination on his departmental major. This examination shall be prepared and conducted by the instructors of the student's major as designated by the Director of Graduate Studies of the Department of Education. Request to take this examination should be made to the Director of Graduate Studies at least two weeks before the date on which the examination is to be conducted.

With thesis. Students who elect this plan are permitted to substitute a thesis for 6 units for the required course work. The thesis subject must be approved by the instructor who is to direct it, and by the Director of Graduate Studies.

In addition to the thesis, the student must present at least 24 units of course credit. Of these, 12 units must be taken in the student's departmental major. Six units, constituting a minor, must be taken outside of the Department of Education. The remaining 6 units are elective within the area of Education and the minor field, but require the approval of the student's major advisor and the Director of Graduate Studies.

The regulations governing the thesis are the same as those for the Master of Arts degree.

The Master of Arts in Teaching

Prerequisites

The degree of Master of Arts in Teaching is designed for teachers already in service and for recent graduates of liberal arts colleges who wish to enter public school teaching.

A student should normally have completed a minimum of 12 semester hours in his proposed major subject and an additional 12 semester hours in that or related subjects. Should a student wish to undertake a graduate major different from his undergraduate major, the prerequisites may be modified upon the recommendation of the student's committee and the approval of the Dean of the Graduate School.

Programs for the Degree

Either of two programs may be arranged, in consultation with the student's committee:

1. A major in Education of 18 to 24 units and 6 to 12 units in non-education courses (for students seeking certification).

2. A major in non-education courses of 18 to 24 units and 6 to 12 units in Education (for students already certified).

In both programs a *minimum* of 30 units is required.

The non-education courses are to be taken in one or more subjects ordinarily taught in the secondary schools. The amount and distribution of this work will be determined by the needs of the individual student. A major in Biological Sciences or in Physical Sciences is possible in this program.

The Master of Arts in Teaching may be earned with or without the presentation of a thesis. If a student, in consultation with his committee, elects to present a thesis, 6 units of the total of 30 units required will be allotted to thesis research. He will then be required to complete 24 units of course credits. The regulations governing the thesis are the same as those for the A.M. (see p. 14). Candidates for the Master of Arts in Teaching who have not had teaching experience are required to take Education 215-216 in which case a minimum of 36 units is required.

The Committee

Each candidate for the degree will be assigned a committee, appointed by the Director of Graduate Studies in the major department or area. This committee will consist of three members, at least one of whom will be from the Department of Education, and at least one from another department. The chairman of the committee will normally be chosen from the department of the major.

Recommendation for Teacher Certification

Elementary school teachers who already hold certificates and who desire the recommendation of Duke University for a graduate teaching certificate must include in their Master's program a minimum of 12 semester hours in subjects ordinarily taught in elementary school and 12 semester hours in courses in education designed to improve them as elementary school teachers.

Secondary school teachers who already hold certificates and desire the recommendation of Duke University for graduate teaching certificates must include in their Master's program a minimum of 18 semester hours in their teaching fields and 6 semester hours in courses in education designed to improve them as secondary school teachers.

The Master of Hospital Administration

Prerequisites

The Master of Hospital Administration degree is designed for persons

intending to pursue a career of management in hospitals and other health agencies.

No specific undergraduate major is required for participation in graduate studies leading to this degree, but certain courses are prerequisites. Required are:

- 2 semesters of natural sciences
- 2 semesters of economics or political science, or 1 semester of each
- 2 semesters of psychology or sociology, or 1 semester of each
- 2 semesters of accounting, either basic or managerial

In selected cases, students who have not completed all prerequisites may be admitted on a conditional basis subject to completion of deficiencies while completing other requirements of the degree program.

Program for the Degree

The program for this degree includes 36 graduate units, of which 18 are in courses in Hospital Administration and 18 are in designated courses in Economics, Political Science, and Sociology.

Completion of this program ordinarily requires 24 months. Included is a 12-month administrative residency which is conducted under faculty supervision in hospitals and other health agencies within commuting distance of the University campus. A portion of the residency is devoted to preparation and presentation of a written management study.

Comprehensive Examination

Successful completion of a comprehensive examination, consisting of both oral and written phases, is a prerequisite qualification for the M.H.A. degree.

The Doctor of Philosophy

The Ph.D. degree is essentially a research degree. Although course work is a necessary part of the student's program, the mere accumulation of course credits will not be sufficient for attaining this degree. The granting of the Ph.D. is based primarily upon the student's knowledge of a specialized field of study and upon the production of an acceptable dissertation embodying the results of original research.

Requirements for the Ph.D. Degree

The formal requirements, discussed in detail below, for the Ph.D. degree are as follows: (1) foreign languages; (2) major and minor courses; (3) supervisory committee for program of study; (4) residence;

(5) preliminary examination; (6) dissertation; (7) final examination. In order to be considered for candidacy for the Ph.D. degree, the student must have passed all of his course work in the first year of graduate study; on at least 9 units of course work he must have made a grade of G or better.

Foreign Languages

A reading knowledge of two acceptable foreign languages is required. (For acceptable languages and methods of meeting this requirement, see p. 10.)

A student working toward the doctoral degree should complete the language requirements for that degree by the end of his first year of residence. If he fails to meet these requirements by the end of his third semester of residence, he must register in the appropriate special reading course or courses (see page 11) until he has satisfied the requirements.

Major or Minor

The student's program of study necessarily demands substantial concentration on courses in his major department. It must, however, include a minimum of six units in a minor subject or related fields approved by his major department. Use of related fields within the major department requires the approval of the Dean of the Graduate School.

Committee to Supervise the Program of Study

As early in a student's course of study as is practicable and *not later than two months before the preliminary examination* the Director of Graduate Studies in the major department will nominate for the approval of the Dean a supervising committee of five, one being designated as chairman. This committee will include at least three members of the major department and one from the minor if a minor is involved. This committee will draw up a program of study and administer the preliminary examination and, with such necessary changes as are approved, the final doctoral examination. However, should all members of the committee be from the major department, at least one member of another department will be added or substituted for the final doctoral examination. The final examination may be administered with a minimum of four members.

When the preliminary examination is arranged, the committee and the Director will submit to the Dean the student's program of study bearing a statement that the Department's course and language requirements have been or are being completed.

Residence

For students who first registered in September 1959 or thereafter the *minimum* registration requirement is 60 units of graduate credit not more

than 30 units of which may be accepted by transfer. Since a full program is 30 units per academic year, the prospective Ph.D. candidate who enters with the A.B. or B.S. degree must plan to spend in residence a *minimum* of two academic years; if he enters with the A.M., his *minimum* residence is one academic year. (For the definition of *residence*, see page 6.) If there are undergraduate deficiencies in his program, he may in addition to the minimum requirements be required to take preliminary undergraduate courses for which he will not receive graduate credit. Even if there are no such undergraduate deficiencies, the student's supervisory committee will determine what requirements if any above the minimum the student must meet.

For requirement of registration see Normal Registration above, page 5.

Time Limitations

1. At the time that the preliminary examination is passed any courses, language certifications, or other credits for advanced standing which are more than six calendar years old will not be accepted toward fulfilling the minimum requirements of the doctoral degree.

2. The student should normally pass the preliminary examination by the end of his second year of graduate study. If he has not passed it by the middle of the third year, he must file with the Dean of the Graduate School a statement explaining the delay and setting a date for the examination. Except under unusual circumstances, extension will not be granted beyond the end of the third year.

3. The doctoral dissertation should be submitted and accepted within two calendar years after the preliminary examination is passed. Should the dissertation not be submitted and accepted within four years after the examination, the candidate, with the approval of his committee, may petition the Dean of the Graduate School for an extension of one year. Should this extension be granted and the dissertation not be submitted and accepted within the year, the student to remain a candidate for the degree must pass a second preliminary examination. In such a case, the time limit for submitting the dissertation will be determined by the Dean of the Graduate School and the candidate's committee.

Credit for Summer Work

Credit earned in the Summer Session will not reduce the minimum required residence (see above, p. 6).

Preliminary Examination

A student is not accepted as a candidate for the Ph.D. degree until he has passed the preliminary examination. A transfer student who may have passed a preliminary examination elsewhere must nevertheless take

the examination in this Graduate School. The examination ordinarily covers both the major and minor fields.

In the summer, a preliminary examination may be scheduled only between the opening and closing dates of the Summer Session.

Privilege of Re-Examination. Should the student fail the preliminary examination, he may apply, with the consent of his supervisory committee and of the Dean of the Graduate School, for the privilege of a second examination to be taken no sooner than three months after the date of the first. Failure on the second examination will render the student ineligible to continue his program for the Ph.D. degree at Duke University.

The Dissertation

The dissertation is expected to be a mature and competent piece of writing, embodying the results of significant and original research.

Filing Title. Not later than March 1 (March 2 if March 1 falls on Sunday) preceding the June commencement at which the degree is expected to be conferred, the student must file with the Dean of the Graduate School, on the official form to be obtained from the Graduate Office, the title of the dissertation. This title must receive the written approval of both the Director of Graduate Studies of the student's major department and the professor who directs the dissertation.

Form. The basic requirements for preparing the dissertation such as quality of paper, form, and binding are prescribed in the instructions for microfilming (see below) and in the *Manual of Style for Theses and Dissertations*, revised 1961, to be obtained from the Duke University Book Store, West Campus.

Submitting Dissertation. The dissertation must be completed to the satisfaction of the instructor who directs it. Four typewritten copies bound in snap binders obtained in the Library must be deposited with the Dean of the Graduate School on or before April 15 preceding the June commencement when the degree is to be conferred. The dissertation must be submitted to the Graduate Office at least seven days before the scheduled date of the student's examination.

Publication on Microfilm. All doctoral dissertations will normally be published on microfilm through University Microfilms, Ann Arbor, Michigan. Authors may, if they wish, also copyright them. The abstract will be published in *Dissertation Abstracts*. *Before final typing is completed, the candidate should obtain in the Graduate Office detailed instructions on the procedure and the microfilming agreement.*

In brief, all copies of the dissertation, the original in clean type, will remain unbound except for spring binders. Ten copies of an *abstract*, carefully written and not more than 600 words long, are submitted when the dissertation is first presented to the Graduate Office. A non-returnable dissertation fee of \$25 is charged for handling and microfilming. If copy-

right is desired, an additional fee is charged of \$6 plus 2½ cents per page. The original copy and first carbon copy will be bound by the Ruzicka Bindery. The fee is \$5.00 a volume. The student may request that more than the two copies be so bound.

Final Examination

The final oral examination shall be primarily on the dissertation. Questions may, however, be asked in the candidate's major field. Except in unusual circumstances approved by the Dean a final examination will not be scheduled between the last day of the spring examination period and registration day in the fall semester.

If a student fails his final examination, he may be allowed to take it for a second time, but not sooner than six months from the date of his first. Permission to take the second examination must be obtained from the instructor who directed the dissertation and from the Dean of the Graduate School. Failure to pass the second examination renders the student ineligible to continue work for the Ph.D. degree at Duke University.

Deposit of the Dissertation

After the examination has been passed, the candidate brings to the Graduate Office the original and first carbon copies of the dissertation, properly signed, and any other copies he wishes bound by Ruzicka. At this time he signs the microfilming agreement and pays such binding and copyright fees as are due.

The Doctor of Education

The Doctor of Education degree is a professional degree planned for those who are, or intend to become, school administrators, supervisors, directors of instruction, curriculum consultants, or college teachers of education.

Admission

The candidate for the Ed.D. degree must meet the same requirements for admission to the Graduate School as the candidate for the Ph.D. degree. In addition to these uniform requirements, the candidate for the Ed.D. (1) must have had at least two years' experience in educational work; (2) must present strong letters of appraisal and recommendation from persons well qualified to speak with authority of his abilities; and (3) must present himself, if possible, for a personal interview. The Standing Committee on the Ed.D. degree reserves the right to insist upon an interview.

Persons who are primarily concerned with meeting requirements set by North Carolina for the advanced certificate for principals and supervisors must request and secure admission for doctoral study.

Residence Requirements

Regulations concerning residence requirements, grades required during the first year of graduate study, and the preliminary examination are the same as those for the Ph.D. (See pp. 19-23.)

Foreign Languages

There are no foreign language requirements for the Ed.D. degree.

Program of Work

The candidate for the Ed.D. degree will choose as his major field either Educational Administration and Supervision or Curriculum and Instruction.

Candidates in Administration and Supervision will take approximately 24 units in that field, including the seminar in School Administration. In addition, they will take approximately 18 units in other professional courses, and a minor of approximately 18 units approved by the candidate's supervisory committee and the Standing Committee on the Ed.D. degree.

Candidates in Curriculum and Instruction will take approximately 24 units in Curriculum and Instruction. In addition, they will take approximately 12 units in other professional courses, and a minor of approximately 24 units in the humanities, the natural sciences, or the social sciences, exclusive of professional education.

The program of work for each candidate must be approved by the Standing Committee for the Ed.D. degree.

Dissertation

The candidate must write a dissertation, for which the formalities of presentation, including its defense in a final examination, are the same as those for the Ph.D. degree. The type of dissertation will depend upon which of the following plans the candidate adopts:

Plan A. A candidate choosing Plan A will write a dissertation which is expected to be a mature and competent piece of writing, embodying the results of significant and original research. It must be, in essence, a contribution to knowledge.

Plan B. A candidate choosing Plan B will serve at least a year in an administrative post, or a teaching position in an elementary or secondary school, subsequent to the completion of all course requirements and a year

of residence. His dissertation may be concerned with a problem, or several closely related problems, growing out of this experience. Although the dissertation written under Plan B is of a practical nature, it must demonstrate the candidate's ability to investigate and report on a significant phase of education in his major field.

Publication on Microfilm. The dissertation will be published on microfilm, as is the dissertation for the Ph.D. (See p. 22.)

Final Examination

Regulations for the final examination are identical with those of the Ph.D. degree. (See p. 23.)

Financial Information

Tuition and Fees

The Graduate School awards such financial aid as fellowships, scholarships, and assistantships. The several departments engage part-time instructors who may be graduate students. The Treasurer of the University, however, has sole responsibility for paying stipends to students, collecting from them such fees as are due, and making special arrangements for prorating fees.

Estimated Expenses in the Academic Year

The necessary expenses of a graduate student are moderate. The University dormitories and Unions provide comfortable and wholesome living conditions at a minimum cost. Incidental expenses for recreation, traveling, clothes, and other items naturally depend on the tastes and habits of the individual. The table below lists the necessary *college* expenses for one academic year for a full program of work:

	<i>Low</i>	<i>Moderate</i>	<i>Liberal</i>
Tuition and fees	\$1200.00	\$1200.00	\$1200.00
Room Rent	310.00	335.00	380.00
Board	475.00	525.00	550.00
Laundry	30.00	40.00	50.00
Books	30.00	40.00	50.00
	\$2045.00	\$2140.00	\$2230.00

General Fees in the Academic Year

The following table shows the general fees and charges collected from all students. All fees for each semester are due and payable, unless otherwise specified, at the time of registration for that semester. All fees are subject to change without notice. No student is admitted to classes until arrangements have been made with the Bursar of the University for the settlement of fees.

Tuition and general fees* (\$40.00 per unit)	\$600.00
Athletic fee, optional, per year, not including federal tax, payable in the fall semester	15.00
Binding fee, two copies of thesis or dissertation, other copies optional, \$5.00 a copy	10.00
ETS Foreign Language Test, each administration, payable to the University Counseling Center	8.00
In absentia fee, due on date of registration, one unit per semester	40.00
Late registration fee	5.00
Microfilming fee, doctoral degree only, upon final submission of dissertation	25.00

* General fees, in lieu of most special charges, include the following fees: Matriculation, Medical, Library, Damage, Commencement, Diploma, and an average of the Laboratory and Material Fees.

Tuition and fees for a full semester program of 15 units amount to \$600.00. For a part program, tuition and fees are computed at the rate of \$40.00 per unit.

Special Fees for Teachers and Others

The Graduate School recognizes a special obligation to encourage the following types of students in their professional and personal advancement: (1) members of the faculties of the neighboring public schools and colleges, currently engaged in *full-time* teaching while taking courses in the Graduate School, (2) ministers of neighboring churches, (3) wives of Duke faculty members, (4) *full-time* employees of Duke University who are paid on a monthly basis *throughout* the year. The reduced fees do not apply to teachers and ministers while on leave of absence, nor to holders of fellowships, scholarships, or graduate and research assistantships, nor to part-time instructors.

Persons eligible for the reduced fee must meet the admission standards required of all graduate students and must be admitted to the Graduate School. They may enroll for one or two courses per semester (in no case totaling more than 7 units) upon payment of a fee of \$5.00 for registra-

tion for each semester and a tuition fee of \$20.00 per unit of credit or an audit fee of \$20.00 per course. The *in absentia* fee will not be charged at this rate.

Audit Fee

In a semester in which a student registers and pays fees for 12 units or more, he may audit one course without charge. Should he be permitted to audit a second course or should he be registered for less than 12 units, the audit fee is \$20.00 per course.

Fee Adjustment with Change of Registration

Arrangements made with the Bursar to prorate tuition and fee charges do not imply that the full amount is not due and payable on the date of fall and spring registration. During the fourteen-day period for change of registration (see Change of Registration, page 5) tuition and fees will be adjusted to necessary and approved changes. After the fourteen-day period no change of tuition and fees is possible.

Stipends and Income Tax

Ordinarily stipends awarded under fellowships and scholarships are not subject to income and Social Security tax. However, a portion of the award to graduate assistants and research assistants may be subject to both. The Graduate Office will supply detailed information.

Living Accommodations

Housing

Duke University strives to provide comfortable, attractive living facilities for resident students both married and unmarried.

Men's Graduate Center is available to men enrolled on a full-time basis in the graduate or professional schools. The majority of rooms are occupied by two persons and the rental charge for a double room is \$155.00 per semester for each occupant. A limited number of single rooms are available but are generally reserved by students who have been in residence the previous year. Accordingly, single rooms are not available for new students.

Epworth Inn on the Woman's College Campus and a graduate section of Hanes Annex are available to women enrolled in the graduate and professional schools. The rental charge for a single room is \$202.50 each semester. Rental charge for a double room is \$167.50 per semester for each occupant.

Rooms are normally rented for the academic year, but for no period less than one semester or term. Apartments are rented on a lease basis for specific periods, usually an academic year or longer.

Duke University Apartments are available for full-time married graduate and professional students. The 224 units are complete with basic furnishings. Current rental rates per month are \$70.00 for an efficiency, \$90.00 for a one-bedroom, and \$110.00 for a two-bedroom apartment. For further information on Duke University Apartments, write to the Director of Housing, Duke University, Duke Station, Durham, North Carolina.

Rooms and apartments may be reserved by applicants only if they have been accepted by the Graduate School of Arts and Sciences, and after the required \$25 room deposit or security deposit has been made with the Office of the Duke University Bursar. The initial room or security deposit is required with the application and is held until the room or apartment is vacated. Application forms will be mailed when the Graduate School of Arts and Sciences has notified the Director of Housing of official acceptance of a student. Completed applications for rooms and apartments are to be returned, with the required deposits, to the Director of Housing, Duke Station, Duke University, Durham, North Carolina.

No refund of residence hall room rent will be made except to students who involuntarily withdraw to enter the armed services. Such refunds will be made in accordance with the University's established schedules.

Regulations governing the occupancy of rooms and apartments will be supplied directly to the applicant by the Director of Housing at the time the application forms are forwarded to accepted students. Occupants within each type of housing are expected to comply with established Duke University Residence Hall Terms and Conditions or the regulations for Duke University Apartments, as appropriate.

For the amount of registration required for admission to student housing, see page 6.

Food Services

Food service on both the Woman's College Campus and the West Campus is cafeteria style. The cost of meals approximates \$2.00 to \$2.50 per day, depending upon the need and taste of the individual. The dining facilities on the West Campus include two straight-line cafeterias with multiple-choice menus, a free-flow service area which includes cafeteria counters as well as a grill, and a table service dining room called The Oak Room where full meals and a la carte items are served by waitresses. The Men's Graduate Center has a cafeteria open at meal hours, and a coffee lounge which is open until 11:00 p.m. The prices are the same as in the West Campus Union. Because of the large number of those served in the dining halls, it is not possible to arrange special diets for individual students.

Fellowships, Scholarships, and Assistantships

For the encouragement and financial assistance of graduate students of marked ability, Duke University has established a considerable number of fellowships, scholarships, and assistantships. The stipends for these range from \$600 to \$3,400. Holders of grants pay tuition and other fees regularly required of all graduate students.

Fellows and scholars pay full tuition and fees and are expected to register for a full schedule of course work each semester. In general, assistants register for a four-fifths program and pay 12 units tuition and fees per semester.

Application for Awards

Application for these awards, along with all supporting documents, must be submitted on or before February 15. Notification of awards other than assistantships may not be sent before March 21 and will be shortly thereafter. Late applications will be considered, should any vacancies occur in the list of appointees. No appointment is made for longer than one academic year.

Further information and application forms may be obtained from the Dean of the Graduate School, Duke University.

Awards offered for 1966-67 are:

Fellowships

Approximately thirty James B. Duke Fellowships with stipends of \$3,600; one Angier Duke Memorial Fellowship of \$3,600; one Otis Green Foundation Fellowship in Humanities or Social Sciences of \$2,500; four Gurney Harriss Kearns Fellowships in Religion ranging up to \$2,800; University Fellowships ranging from \$2,000 to \$3,000.

University Scholarships

The University offers a number of scholarships with stipends ranging from \$600 to \$1,800.

Graduate Assistantships

Appointments as Departmental Assistants and readers carry a total stipend in the range of \$1,000 to \$3,200. The value of stipend is determined by the fraction of time given to assisting, the qualifications of the assistant, and the nature of work assigned.

Research Assistantships

Appointments are for pre-doctoral candidates whose special training and qualifications enable them to serve as assistants to individual staff members in certain departments. Stipends range from \$600 to \$3,000 based on the assisting time required.

Appointments to qualified, advanced students as Research Associates, Research Fellows, and Research Scholars. Stipends range upward from about \$1,800.

Special Fellowships

Cokesbury Graduate Awards in College Teaching

These awards, sponsored by the Board of Education of the Methodist Church, are designed to assist graduate students who are committed to a Christian philosophy of higher education and who intend to teach in college. The applicant must have been a member of the Methodist Church for at least three years, and must have been accepted for or be currently pursuing a program of graduate studies at one of the Methodist-related universities, including Duke University, approved for this program. Awards, for one year, vary in amount from \$600 to \$2,500.

Application must be completed before February 15. For further information and application forms, apply to the Dean of the Graduate School.

Charles W. Hargitt Research Fellowship in Zoology

The Charles W. Hargitt Research Fellowship in Zoology is devoted to the promotion of research in the field of cellular studies. It may be awarded to post-doctoral candidates or established investigators who desire to engage in research and to outstanding predoctoral candidates in support of their graduate training. The recipient will be expected to engage in full-time research or training and will have no departmental duties. Research facilities will be provided. Appointment is for one year with the possibility of reappointment.

Inquiries and applications should be addressed to the Chairman, Hargitt Fellowship Committee, Department of Zoology.

Shell Fellowships

In African Studies. Two fellowships are available to qualified students in social sciences who are preparing for careers in the State Department, including the foreign services of the United States, the United Nations, or other international agencies, or in research and teaching in international affairs in academic institutions within the United States. They must be citizens of the United States or presently residing permanently in the

United States and intending to become citizens. The fellowships are intended to cover the expenses of field research in the preparation of doctoral dissertations. The stipend for each fellowship is \$4,000 plus a reasonable amount for transportation expenses. Inquiries should be made to the Executive Secretary, Commonwealth-Studies Center, Duke University.

Exchange Fellowships with the Free University of Berlin

Duke University has an exchange arrangement with the Free University of Berlin which will provide fellowships for two graduate students to work during the regular academic year in Berlin. Departments will submit nominations to the Dean of the Graduate School before February 15.

Peace Corps Fellowships

Two Peace Corps Fellowships may be offered to first-year applicants to a doctoral program who have completed duty with the Peace Corps. Request for consideration for this award should be noted on the application for admission, which must be filed before February 15. Recommendation will be made by the major department. The stipend will vary from \$2,000 to \$3,000.

Fellowships and Graduate Scholarships in Forestry

Information regarding special fellowships and graduate scholarships in forestry may be obtained from the Dean of the School of Forestry, Duke University, Durham, North Carolina.

Federal Fellowship Programs

In 1965-66 Duke University was approved to offer programs sustained by National Defense Act Graduate Fellowships in Botany, Chemistry, Economics, History, Mathematics, Philosophy, Physics, Political Science, Psychology, Romance Languages, Sociology, and Zoology, and Foreign Language Fellowships. The University is approved to recommend applicants for Summer Fellowships for Graduate Teaching Assistants offered by the National Science Foundation, to offer NASA Predoctoral Traineeships in the space sciences, and NSF Graduate Traineeships.

Part-Time Instruction

A number of departments offering graduate work make use of exceptionally qualified graduate students as part-time instructors. These students are usually able to register for a graduate program of 9 units a

semester. Inquiries concerning such appointments should be directed to the Chairman of the Department concerned.

Loans

The University has been allotted a sum for use under the provisions of the National Defense Act Loan fund. In addition, University funds are available to grant low-interest loans to deserving students of good academic standing. Application should be made to Mr. W. O. Petty, Jr., 102B Allen Building, Duke University. For the amount of registration required for eligibility for loans, see page 6.

Payments to Holders of Awards

Payments of stipends to all graduate students holding fellowships, scholarships, and graduate assistantships for the academic year are made by the Bursar of the University in eight monthly installments payable on the 21st of each month beginning October 21st. Arrangements may be made to prorate tuition charges on the same basis.

Student Life

Services Available

Medical Care

The complete medical facilities of the Duke University Medical Center are available to all members of the University community. To secure the benefits of the Student Health program, a graduate student during the term or semester in which the illness occurs must (1) in the Summer Session term be registered for at least 1 unit research or 3 units of course work, (2) prior to completing minimum residence requirements be registered for at least 9 units per semester and thereafter according to the schedule on pp. 5 and 6. Students are not covered during vacations and their dependents and members of their family are not covered at any time. Care is provided for men at the Student Health Office in Duke Hospital and for women at the Woman's College Infirmary.

The service provided includes hospitalization in Duke Hospital, when recommended by the Hospital staff, to a limit of thirty days; medical and surgical care under the supervision of a senior physician or surgeon; drugs, X-ray work, and ward nursing. Students pay for board while in the hospital. Excluded from the service are refraction of eyes, treatment of teeth, and of all chronic and pre-existing conditions, and elective surgery.

Graduate students are urged to carry adequate health insurance to supplement Student Health Program services. If students have insurance providing hospitalization, surgical, or medical benefits, the benefit shall be applied to the cost of their medical care.

Students whose course-load entitles them to full coverage under the Student Health program are eligible for a complementary insurance policy which then comprises protection for the entire calendar year. Concerning this complementary policy inquire of the Dean of the Graduate School. *Foreign students are required to hold this or another acceptable policy.*

Student Activities

Graduate students new to Duke University may be reminded that they are welcomed to use such recreation facilities as swimming pools, tennis courts, golf course, and to affiliate with choral, drama, and religious groups. They may become junior members of the American Association of University Professors and may affiliate with Phi Beta Kappa and social fraternities. Wives of graduate students may join the very active Graduate Wives Club.

The Duke University Counseling Center

Through the counseling center, the University provides a professional counseling service designed to aid students in gaining a better understanding of themselves and the opportunities available to them. Counseling is available in the areas of career planning, educational opportunities, and personal and social adjustment.

The Center maintains files of educational and vocational information related to career planning, graduate educational programs and fellowships, and study aids.

National and University-wide testing programs are administered by the Center. A continuing program of research in the areas of counseling and testing is also carried on by the staff of the Center.

Appointments Office

Duke University maintains an active Appointments Office which has steadily been placing students in teaching and industrial positions. The services of this office are available without charge to graduate students. Those who are interested in securing employment through the Appointments Office, or those who wish to have available for their own use in securing employment a complete file containing their academic record and pertinent recommendations, should register in this office.

Research and Publications

The several departments of the University are devoted to research as well as to instruction. Since the University exists for the promotion and diffusion of knowledge, attention is rightly placed, in the Graduate School, on research activities.

In furtherance of the University's obligation to promote and diffuse knowledge, the President annually appoints a University Council on Research, which receives applications from members of the various faculties for subsidies in support of research. Vigorous and forward-looking policies of this Research Council have initiated and encouraged the completion of many substantial and important research projects.

The Duke University Press takes its place as a significant agency in the diffusion of knowledge. Created in 1925, as a successor to the Trinity College Press, the Duke University Press continued the publication of the *South Atlantic Quarterly*, published at Trinity College since 1902, and in 1926 revived the *Hispanic-American Historical Review*, which had been founded and published from 1918 to 1922 by a group of scholars interested in Hispanic America. In 1929 *American Literature* was begun with the cooperation of the American Literature Group of the Modern Language Association. This journal was followed in 1931 by *Ecological Monographs*, and in 1932, *Character and Personality* (since 1945 the *Journal of Personality*). In 1935 the Press began the publication of the *Duke Mathematical Journal*. Since 1948 it has published *Ecology*, the official journal of the Ecological Society of America. The Law School of Duke University publishes *Law and Contemporary Problems*, *The Duke Bar Journal*, and *The Journal of Legal Education*.

The Press, since its organization, has published more than three hundred and fifty volumes, including four series of monographs and twenty-five books published for the Duke University Commonwealth-Studies Center, and has thus made public the fruits of scholarly research of the Duke faculty and of scholars elsewhere. In the broadest sense, the policy of the Press is to make available to the public any scholarly work that merits publication though special attention is given to works in domains of knowledge cultivated by the University.

Visiting Scholars

The libraries and, to the extent practicable, other facilities of Duke University will be made available to faculty members of colleges and universities who wish to spend a period of time on the campus in pursuit of their scholarly interests. No fees will be charged such visitors unless they wish to participate in activities for which a special fee is assessed. Room and board may be arranged for at the regular rates in the

dormitories and dining rooms. Dormitory space is usually available during the summer months. Inquiries concerning residence for visiting scholars should be directed to the Dean of the Graduate School of Arts and Sciences.

Motor Vehicles

Each student possessing or maintaining a motor vehicle at Duke University shall register it annually at the beginning of the fall semester. If a student acquires a motor vehicle and maintains it at Duke University after enrollment, he must immediately register it. At the time of registration of a motor vehicle the following documents must be presented:

(a) State vehicle registration certificate.

(b) Valid driver's license.

(c) Satisfactory evidence of automobile liability insurance coverage with limits of at least \$5,000 per person and \$10,000 per accident for personal injuries, and \$5,000 for property damage, as required by the North Carolina Motor Vehicle Law.

(d) If the student is under 21, a statement signed by the student's parent or guardian granting the student permission to operate a motor vehicle at Duke University.

Facilities for Graduate Study

The Libraries

The University Libraries contain 1,725,000 volumes. In addition to the collections in the General Library, there are eight school and departmental libraries: Divinity, 120,098 volumes; Engineering, 34,905 volumes; Law, 139,827 volumes; Medical, 71,644 volumes; Woman's College, 150,111 volumes; Biology-Forestry, 84,228 volumes; Chemistry, 21,813 volumes; Mathematics-Physics, 29,069 volumes. In 1964-65, 70,465 volumes were added; 8,100 periodicals and 125 newspapers are received currently.

The General Library building, which was doubled in size in 1949, incorporates many modern arrangements for the preservation of the collections and for the convenience of the research scholar. Construction on an extension of the general library facilities, designed to provide twice the existing space, will begin early in 1966. Book stacks, storage areas, and quarters for rare books and manuscripts are air-conditioned. In the stacks, 274 carrels are available to graduate students as places of study, and a large reading room on the first floor of the building is reserved for graduate students. Upon application, graduate students may receive permit cards entitling them the use of the stacks.

A division of photographic services, with the most modern cameras and other equipment for microfilming or other photographic reproduction of printed and manuscript materials, provides a battery of reading machines

to serve the Library's large collection of microfilms of rare books, periodicals, and newspapers.

The extensive resources of the Library for research students may be suggested by the following special collections:

The Trent Collection of Walt Whitman, containing the first and all other important early editions or issues of *Leaves of Grass*; books and articles of Whitman biography and criticism; nearly 300 manuscripts and 400 letters; and pictures, sheet music, and other miscellanea.

The George Washington Flowers Collection of books, manuscripts, pamphlets, and newspapers on all phases of Southern history.

The Arents Collection of several hundred volumes relating to the culture and production of tobacco and the manufacture and distribution of tobacco products.

The James A. Thomas Collection of books on Chinese history and culture.

The Guido Mazzoni Library, a collection of approximately 23,000 volumes and 67,000 pamphlets covering the whole range of Italian literature, with special strength in the nineteenth century.

The Gustave Lanson Library of 12,000 books and monographs on French literature.

Latin-American Collections, built around a special Peruvian library of 7,000 books and manuscripts, a Brazilian library of several thousand volumes, and an Ecuadorian library of 2,000 volumes, supplemented by strong collections of the public documents of these and other Latin-American countries.

The Robertson Library of Philippiniana.

The Frank C. Brown Folklore Collection, consisting of about 38,000 manuscript pieces, 1,400 vocal recordings, and 650 musical scores of North Carolina folklore.

The Strisower Library of International Law, numbering about 5,000 volumes, with many rare books and periodical files.

The Trent Collection in the History of Medicine (Medical Center Library), containing about 3,000 books and 2,500 manuscripts with special strength in anesthesia, anatomy, English medicine, vaccination, yellow fever, pharmacy, and medical biography.

The Holl Church History Library, dealing primarily with the period of the Reformation.

The Frank Baker Collection of Wesleyana and British Methodism, consisting of 1,500 editions of the works of John and Charles Wesley, 8,000 volumes concerning all phases of the development of British Methodism, 4,000 volumes relating to the religious and social background of British Methodism, and 4,000 manuscript pieces by the Wesleys and their coadjutors and by British Methodists of the last 200 years.

Collections in English and American Literature, where emphasis has

been placed principally on the eighteenth and nineteenth centuries, with the collections of Swinburne, Tennyson, Rossetti, and Bryant, significant groups of annotated copies and first editions of Coleridge and Byron, the Carroll Wilson collection of Emerson, some 5,000 items of eighteenth-century English poetry and prose, and the Paul Hamilton Hayne library of American literature.

In addition to these and other special collections, the Libraries contain excellent files of United States federal and state documents, public documents of many European and Latin-American countries, and publications of European academies and learned societies. The newspaper collection, with 13,300 volumes and 15,000 reels of microfilms, has several long eighteenth-century files, strong holdings of nineteenth-century New England papers, and of ante-Bellum and Civil War papers from North Carolina, South Carolina, and Virginia; there are also many European and Latin-American papers. The manuscript collection of 3,900,000 items is particularly strong in all phases of the history, politics, and social and economic life of the South Atlantic region, though it includes also significant papers in English and American literature, and several notable medieval manuscripts in both Greek and Latin.

Science Laboratories

Botanical and Zoological Laboratories

Facilities for graduate study in the Departments of Botany and Zoology are located on the West Campus. A new Biological Sciences building, completed in 1962, contains well-equipped modern laboratories for teaching and research in the various fields of botany, forestry, and zoology. Special facilities are available, such as animal rooms, greenhouses, dark-rooms, refrigerated and controlled environment laboratories, electron microscopes, Van de Graaff accelerator, X-ray machines and other radiation and radioisotope equipment, and other modern research facilities. A large "phytotron" is under construction.

The Botany Herbarium, containing over 310,000 specimens, is world-wide in scope and includes notable collections of mosses and lichens. The Biology-Forestry Library contains an outstanding collection of books and periodicals. The Library currently subscribes to over 800 journals and has 85,000 volumes. Unique assets for teaching and research are the Sarah P. Duke Gardens, conveniently located on the West Campus; the Duke Forest, comprising 7,000 acres of woodland adjacent to the West Campus; the Field Station for the Study of Animal Behavior; and the Duke University Marine Laboratory at Beaufort, North Carolina.

Scholarships for advanced study during the summer months are maintained at the Highlands Laboratory, Highlands, North Carolina, at the

Marine Biological Laboratory, Woods Hole, Massachusetts, and at the Duke University Marine Laboratory. Requests for information concerning scholarships at the Highlands Laboratory should be addressed to the Botany Department, those at Woods Hole to the Zoology Department, and those at Beaufort to the Duke University Marine Laboratory.

Marine Laboratory

The Duke University Marine Laboratory is located at Beaufort, North Carolina, one and one-half miles from the open ocean. The physical plant includes five well-equipped research buildings, three class rooms, and three dormitories. The Laboratory provides excellent facilities for graduate courses in botany and zoology and for thesis research throughout the year. Special research and training facilities for field work in marine biology and biological oceanography include two motor vessels and a new 118-foot biological research vessel *Eastward*, with specialized apparatus for collecting and environmental measurements.

Six National Science Foundation Predoctoral Traineeships in biological oceanography and two Bureau of Commercial Fisheries Educational Grants in marine biology are available to advanced graduate students during the academic year. In the summer of 1966 twenty-five National Science Foundation Predoctoral Awards will be offered for course or research work in marine biology at the Marine Laboratory. For information concerning awards, courses, and research space, write to the Director, Dr. C. G. Bookhout, Duke University Marine Laboratory, Beaufort, North Carolina.

Animal Behavior Station

Located less than one mile from the campus, the 75 wooded acres of the Station provide facilities for studies of penned and free-ranging, and caged animals. These facilities include sound-proof observation chambers, barns, aviaries, and pens for large mammals and birds, and two water-fowl ponds. A permanent facility for pro-simian primates (both simulated "natural habitats" and cages) is under construction. For information regarding research space or research assistantships in Behavior, write to Dr. P. H. Klopfer, Dept. of Zoology, or Dr. D. K. Adams, Dept. of Psychology.

Physical Laboratories

The Physics Building, comprising about 130,000 square feet of floor space, is devoted to the research and instruction of the Departments of Physics and Mathematics.

In addition to the lecture halls and the elementary laboratories, the building includes special laboratories for work in electronics, microwaves,

optical spectroscopy, atomic, nuclear, high energy, and low-temperature physics. Special research equipment includes a 21-foot concave grating and other instruments for visible, ultraviolet, and Raman spectra; facilities for research in microwave spectroscopy and other high-frequency phenomena; two Van de Graaff accelerators, one 4 MEV and one high intensity 3 MEV, and associated equipment for nuclear physics research; a helium liquifier, other low temperature equipment, and three large electromagnets for nuclear resonance research below 1° Kelvin; a DDP-24 control computer which is used on-line with two conventional projection microscopes to measure bubble chamber tracks of high energy particles.

The Physics Building contains the Mathematics-Physics library, an IBM 7072 computer, and a shop staffed by ten instrument makers, six electronics technicians, and a glass blower.

Chemistry Laboratories

The Chemistry Building has a floor area of approximately 57,000 square feet, of which more than half is devoted to advanced teaching and research. The Department is well-equipped for conducting research in analytical, inorganic, organic, and physical chemistry. Programs are active in all of these areas. For support of these programs, modern instruments are available for routine measurements, as well as for research involving ultraviolet, visible, and infrared spectroscopy. Also provided are two nuclear magnetic resonance spectrometers, one for routine analytical purposes, and the other, a high resolution instrument, for research. In addition to extensive equipment for X-ray crystallography, facilities are available for electron spin resonance measurements, polarography, light scattering, and mass spectrometry.

Well-equipped shops, with a mechanic and an electronics technician, provide facilities for the construction of special apparatus and for repair and maintenance of instruments.

The Chemistry Library, conveniently located in the building, has on its shelves over 20,400 volumes, and currently subscribes to over 220 scientific periodicals.

Psychology Laboratories

The Psychology Department occupies new and fully renovated quarters, comprising about 53,000 square feet of floor space, which house its main laboratories, seminar rooms, classrooms, and special facilities. The building is completely air-conditioned for year-round research and study. For the use of graduate students and staff, the Department houses a periodical reference room with an extensive collection of current and bound journals and monographs in psychology and related subjects. In addition to general purpose laboratories, there are special facilities for animal behavior studies; sound-proofed and electrically shielded rooms for use

with human and animal subjects; specially equipped rooms for the study of visual perception; electrophysiological recording rooms; a histological laboratory and surgery; photographic dark rooms, etc. The social psychology unit (joint with the Department of Sociology) contains observation, communication, and recording facilities for the study of social interaction. There is an extensive suite of interview and observation rooms for the study of human personality and clinical processes. An on-line digital computer is located in the animal behavior laboratories, and automatic computation equipment is available for all research purposes. A departmental shop, with competent technicians in charge, is maintained to provide specialized mechanical and electronic apparatus. Other facilities for research and teaching are available in the laboratories and clinics of the adjacent Duke Medical Center.

A number of clinical installations for adults and children, devoted to an extensive range of clinical and guidance problems, cooperate with the department in providing facilities for research and training. In addition, the Department operates a Preschool Laboratory for four- and five-year old children. The Department cooperates with the Department of Zoology in the operation of a 75-acre field station in the near-by Duke Forest for the study of animal behavior in natural settings. (See p. 41, Animal Behavior Section.)

Computing Laboratory

Since 1958 an IBM electronic digital computer has been available in the Computing Laboratory for instruction in programming and for research. The Computing Laboratory is under the guidance of the Department of Mathematics and is being used for research in the physical sciences, engineering, mathematics and in the biomedical and social sciences. Currently equipped with an IBM 1401/7072, the Laboratory will be equipped, beginning in 1966, with an IBM 360 computer which will have direct access through a telephone linkage to an IBM 360 Model 75 having very large memory capacity. This computational network will be shared with North Carolina State University at Raleigh and the University of North Carolina at Chapel Hill, and will form, at the time of its installation, one of the most powerful computing systems available to any university.

Engineering Laboratories

The instructional and research laboratories, together with the library, classrooms, shops, and offices, are located in the Engineering Building on the West Campus. Engineering laboratories of particular interest to graduate students are these:

Civil Engineering: experimental stress analysis; hydrodynamics;

materials science; sanitary engineering; soil mechanics; and structural models and mechanics.

Electrical Engineering: solid-state materials; ferromagnetics; superconducting circuits; electronics; analog computer; automatic control; energy conversion; spacecraft electrical systems; and spacecraft telemetry systems.

Mechanical Engineering: heat transfer, fluid mechanics, environmental thermodynamics; response of physical systems; vibration studies.

These facilities are described in the *Engineering Bulletin*.

Forest Sciences Laboratory

The establishment of the Forestry Sciences Laboratory research facility of the Southeastern Forest Experiment Station in the Research Triangle Park near Durham provides an unusual opportunity for complementing the research programs of students in the Department of Forestry. Specialized research projects in forest entomology, pathology, physiology and soils are currently under way at the Laboratory. The staff of the Laboratory is available for consultation, participation in seminars and may offer advice to students conducting research in the Department of Forestry. Arrangements may also be made for students to conduct certain aspects of their research at the Laboratory.

Duke Forest

The Duke Forest consists of approximately 7,000 acres of land, most of which is adjacent and easily accessible to the University campus. Situated in the lower Piedmont region and composed of second-growth shortleaf pine, loblolly pine, and hardwoods, the Forest is representative of the various types of timber growth and soils found throughout the region. Through placing the Forest under intensive management for forestry purposes, substantial progress has been made in developing the educational work and research in forestry.

The proximity of the Forest to the laboratories, greenhouses, and library facilities of the University provides an excellent opportunity for advanced study and research in forestry. Research, particularly in the fields of silvics, forest soils, silviculture, forest management, properties of wood, forest-tree physiology, forest entomology, and forest pathology, is well under way. Several members of the botany and zoology staffs are also engaged in research in the Duke Forest.

Commonwealth-Studies Center

The Commonwealth-Studies Center was established at Duke University in 1955 and has received financial support from the Carnegie Corporation

of New York, the Rockefeller Foundation, and the Ford Foundation. Its objectives are:

1. to encourage and stimulate by financial assistance and other means the research interests of individual scholars in Commonwealth fields,
2. to establish at Duke University a Center whose facilities will promote interest in research relating to the Commonwealth, provide the materials for basic research, and encourage research by Commonwealth and American students and faculty.

The Center awards fellowships to graduate students from Australia, Canada, and New Zealand who propose to study for the Ph.D. degree in economics, history, or political science at Duke University. National selection committees in each of the mentioned countries facilitate the selection of fellows.

Each spring the Center sponsors a joint seminar for graduate students in economics, history, and political science. In addition the Center sponsors occasional lectures at the University by distinguished Commonwealth scholars.

Financial assistance is provided to students and faculty at the University for field research in Commonwealth countries. Studies resulting from research sponsored by the Center are frequently published by the Duke University Press in the Commonwealth-Studies Series. The Center also distributes in its reprint series selected published articles that relate to the Commonwealth. Inquiries should be addressed to the Executive Secretary, Commonwealth-Studies Center, Duke University, Durham, North Carolina.

Special and Cooperative Programs

Program in Comparative Studies on Southern Asia

The Program in Comparative Studies on Southern Asia was established at Duke University in 1961 following a grant from the Ford Foundation to the Commonwealth-Studies Center to enable it to develop a research and training program on that area. In 1961 the university entered into a contract with the United States Office of Education and sponsored a South Asian Language Training and Area Center under the provisions of Title VI of the National Defense Act. The basic purpose of this program is twofold: to facilitate research on the political, historical, economic and socio-cultural development of Commonwealth countries for Southern Asia (India, Pakistan, Ceylon, Malaysia and Singapore) and to provide for the systematic training of graduate students in economics, history, political science, and sociology-anthropology with special emphasis on the area.

The graduate student, in addition to meeting the requirements of the department in which he is enrolled, is expected to take Hindi-Urdu or another major South Asian language, the cognate courses in other departments and to undertake field research in the preparation of his dissertation.

The Program awards each year a limited number of pre-doctoral fellow-

ships for graduate studies in the discipline and under the expectations listed above. Awards carrying the same expectations are also made under the NDEA Title VI language fellowships offered by the United States Office of Education.

Facilitation and support of research activities by members of the Duke University faculty and graduate students is an important aspect of the Program's activities. It supports through travel grants and subsistence allowances field research by persons affiliated with the University. Research grants for faculty and students are also available from the American Institute of Indian Studies and the United States Office of Education. Research facilities include those materials received as a result of the University's participation in a library acquisitions program under the terms of Public law 480.

The Program has undertaken the publication of three series: hard-cover monographs, reprints of articles of note dealing with the Southern Asian region and a series of occasional papers. Inquiries should be addressed to the Executive Secretary, Commonwealth-Studies Center, Duke University, Durham, North Carolina.

Hispanic Studies Program

The Graduate School offers an inter-departmental program of Hispanic studies leading to the A.M. and Ph.D. degrees. Students may write their theses and take their degrees in history, economics, political science, sociology, and Hispanic languages and literatures. The purpose of the program is to make possible desirable combinations of courses on the Hispanic world in these related disciplines and to bring to bear more strength of the faculty upon the training of a single candidate. This may be achieved through a judicious use of minors or by such special arrangements as may from time to time become necessary.

The Duke University Library holdings have been built up to facilitate graduate work and research in Hispanic-American cultural history, inter-American relations, economic history, politics, and Spanish-American literature. These collections are being constantly enlarged.

The Population Studies Program

The Population Studies Program at Duke University was established in 1963 as a joint enterprise of the Departments of Economics and Sociology and was charged with both educational and research functions in the area of Demography and Human Ecology.

Training under the auspices of the Program leads to a Ph.D. degree within the Departments of Sociology or Economics with a specialization

in Population Studies. Two training programs are available, one in each department. Each is designed to provide an integrated and cross-disciplinary training in the common speciality area of Population Studies.

In addition to cross-departmental courses, program unity is produced through a Population Studies Seminar. This Seminar, which is non-credit and informal, is attended by advanced students and by faculty in both departments. The Seminar provides briefing on demographic research conducted by both faculty and students in the two departments. It also serves as a vehicle for a number of visiting lecturers in demography each semester.

Graduate fellowships for students in the Program are available in either of the two departments.

Oak Ridge Institute of Nuclear Studies

Duke University is one of the sponsoring universities of the Oak Ridge Institute of Nuclear Studies located at Oak Ridge, Tennessee. The graduate research program at Duke has available to it all the facilities of the Oak Ridge National Laboratory and the cooperative supervision of student research by the staff at Oak Ridge.

Fellowships in several fields of science are available to qualified applicants.

Graduate Fellowship Program. On application by a university the Institute awards fellowships to candidates for the master's and doctor's degree. The student uses the fellowship to conduct his thesis research in an Oak Ridge laboratory.

AEC Special Fellowships. These are available in the fields of (1) Nuclear Science and Engineering, (2) Health Physics, (3) Advanced Training in Health Physics, and (4) Industrial Hygiene.

The application deadlines differ for different fellowships. Further information may be obtained from Lewis E. Anderson, Department of Botany.

Cooperative Programs with the Consolidated University of North Carolina

Interchange of Registration. (See p. 7).

Library Exchange

Students of both the University of North Carolina and Duke University are granted certain library privileges in the respective libraries of each University. Books unavailable in one library may be procured at short notice through an interlibrary loan service.

The Cooperative Program in the Humanities

The Cooperative Program in the Humanities, jointly managed by Duke University and the University of North Carolina at Chapel Hill, aims at expanding and improving activities in the humanities in the two universities and throughout the region. The Program was established in 1963, with offices on both campuses, and receives substantial financial support from the Ford Foundation.

The central feature of the Program is a cooperative exchange between the two universities, on the one hand, and a number of liberal arts colleges on the other. Academic-year research leaves are made possible for faculty members from humanistic departments of liberal arts colleges located in Virginia, North Carolina, and South Carolina. These scholars are known as Humanities Fellows. Each Fellow has an important, clearly defined research project. As partial replacements for the Humanities Fellows during their year of leave, the Program offers to the colleges advanced graduate students from the two universities.

The Program sponsors semester visits of distinguished professors in the Humanities. In addition to teaching, these Professors also give occasional public lectures on both campuses. The Program also makes possible shorter visits by well-known foreign humanistic scholars.

The Program has established two editorial internships, filled by advanced graduate students. These graduate students have the opportunity to become familiar with the processes and technical aspects of scholarly publication.

Each spring the Program will sponsor a humanities symposium. Representatives of colleges in the region and several outstanding humanists from other regions will participate, along with all persons directly involved in the Program.

The Program will conduct two summer activities: (1) The Southeastern Institute of Medieval and Renaissance Studies has been established for the advancement of scholarship and the improvement of teaching in the southeastern region. The second Institute will consist of nine informal seminars, each led by a Senior Fellow. Each seminar will have an enrollment of six faculty members from colleges in the southeastern region. Students of all areas of medieval and renaissance studies are invited to participate. (2) A number of Summer Research Awards are available for faculty members at Duke and the University of North Carolina.

Inquiries may be directed to the Program office, 102 Library, Duke University.

Cooperative Program in Russian and East European History

The graduate schools of Duke University and the University of North Carolina offer a cooperative program leading to the M.A. and Ph.D. degrees in Russian and East European history. Students admitted to

one institution are encouraged to enroll in those courses in the other that are advantageous to their programs, and to utilize the libraries and facilities of both universities. The holdings of the two libraries in Russian and East European history are substantial and complementary. Both libraries have a policy of purchasing all significant published works in Slavic history, economics, government, geography, literature, and linguistics. Graduate assistantships and fellowships of various types complete the program.

Courses of Instruction

In general, courses with odd numbers are offered in the fall semester, those with even numbers in the spring semester. Double numbers separated by a hyphen indicate that the course is a year-course and must normally be continued throughout the year if credit is received. A student must secure written permission from the instructor in order to receive credit for either semester of a year-course. Double numbers separated by a comma indicate that although the course is a year-course, credit may be received for either semester without special permission.

Normally, courses which bear no date are offered every year; those marked with an asterisk are offered only when the need arises.

Note: In each department the number 399 is reserved to designate special (individual readings in a specified area and supervised by a regular member of the Graduate staff, credit 1-3 units each registration, 9 units maximum in three successive registrations. The course is restricted to resident doctoral programs, should have a completion exercise, and must carry a grade. When used it appears in this form: [Department] 399, Special Reading in [area], (Instructor). [1 to 3] units.

Anatomy

Professor Markee, *Chairman*; Associate Professor Duke, *Director of Graduate Studies* (431 Medical School); Professors Everett and Peele; Associate Professors Becker, Buettner-Janusch, and Moses

The Department of Anatomy offers graduate courses and training leading to the A.M. and Ph.D. degrees. Further information may be obtained from the Director of Graduate Studies of the department.

M201. *Anatomy as Related to Locomotion.* Complete dissection of that part of the body concerned with locomotion and posture. (See also Course M205). Feb.-June. Prerequisite: One year each of biology, chemistry, and physics. 2 units. *Professors Markee and Everett; Associate Professor Duke*

M202. *Microscopic Anatomy.* Conferences and laboratory work on the morphological characteristics of the tissues of the animal body. The work is based upon a study of fresh and prepared material and is approached from the physiological viewpoint. Sept. to Jan. Hours and credits (maximum 3 units) by arrangement. Prerequisite: adequate training in histology or cytology. *Professors Markee and Everett; Associate Professors Becker, Duke, and Moses*

M203. *Anatomy of the Nervous System.* A study of the gross and microscopic structure of the human central nervous system, special attention being paid to the structural and functional relationships between the various nuclei and fiber tracts. Feb. to June. Hours and credits (maximum 4 units) by arrangement. Prerequisite: Anatomy M201. *Professors Markee, Everett, and Peele; Associate Professors Becker and Duke*

M204. *Neuroanatomical Basis of Behavior.* A study of the gross and microscopic anatomy of the nervous system with emphasis on the structural and functional relationship between tracts, nuclei, and cortical areas. Restricted to graduate students with the equivalent of a major in psychology. (Jan. to June) 3 units. *Professor Peele*

M205. *Anatomy of the Viscera.* This is a study of the gross anatomy of the thoracic, abdominal and pelvic organs and the deeper structures of the head. Sept. to Jan. Prerequisites one year each of physiology, chemistry, and physics. 6 units. *Professors Markee, Everett; Associate Professors Becker and Duke*

M231. *Physical Anthropology.* A survey of the major developments of physical anthropology. Human evolution, primate phylogeny, paleontology of man and other primates, primate biochemical genetics, primate behavior, human variation (genetic and somatic) are the principal topics of the course. 3 units. (Listed also as Anthropology 231.) *Associate Professor Buettner-Janusch*

M244. *Cytology.* Topics in cell structure and function. Advanced discussions of selected problems such as chromosome structure, mitosis, and cytological aspects of inheritance and development. Feb. to June. (1966 and alternate years). 2 units. Prerequisite: Zoology 243 (Botany 243) or equivalent and permission of instructor. (Listed also as Zoology 244.) *Associate Professors Moses (Anatomy) and Nicklas (Zoology).*

M301. *Gross Human Anatomy.* A course especially for Ph.D. candidates in Anatomy, comprising a complete dissection of the cadaver. The

laboratory work is supplemented by conferences which place emphasis on the biological aspects of the subject. Sept. to June. Hours and credits (maximum 8 units) by arrangement. Prerequisite: adequate training in comparative anatomy and embryology. *Professors Markee and Everett; Associate Professors Becker and Duke*

M312. Research. Individual investigations in the various fields of anatomy. Credits to be arranged. *Professors Markee, Everett, and Peele; Associate Professors Becker, Buettner-Janusch, Duke, and Moses*

M313-314. Anatomy Seminar. Weekly meeting of graduate students and staff in which current research problems in Anatomy will be presented. Required of all graduate students who are candidates for the A.M. or Ph.D. degree. 2 units. Sept. to Jan. *Professors Markee, Everett, and Peele; Associate Professors Becker, Buettner-Janusch, Duke, and Moses*

M378. Reproduction. A lecture and laboratory course dealing with mammalian reproduction. The rat and rabbit will serve as the principal laboratory subjects. The following areas will be covered: embryology of the reproduction system; gonadal structure, gametogenesis and hormone production; structure and function of the diencephalic-pituitary system; structural, chemical and behavioral actions of sex hormones; mechanisms of fertilization and implantation; placental structure and function; lactation. Feb. to June (1966 and alternate years). 4 units. Admission with approval of instructors. (Listed also as Physiology 378.) *Professor Everett (Anatomy); Associate Professor Kostyo (Physiology).*

Art

Professors Hall, Markman, and Patrick; Adjunct Professor Bier; Associate Professor Sunderland

No graduate degree is offered in this department, but the following courses are suggested as possible minors for students majoring in anthropology, history, literature, philosophy, religion, psychology, or sociology, or in any other interested department.

215. Religious Art of the Ancient Near East. A specialized study of the development of art, particularly architecture and sculpture, as the material expression of religious ideas in Egypt, Mesopotamia, and in part of Syria and Palestine, to the Persian conquest. 3 units.* (w) *Professor Markman*

216. Religious Art of the Classical World. A specialized study of the religious art, particularly architecture and sculpture, of Greece and Rome, with special emphasis on the monuments in the Near East. 3 units.* (w) *Professor Markman*

217. Aegean Art. A study of the problems of Aegean art as the forerunner of Greek art and in relation to the contemporary civilization of the eastern Mediterranean world. 2 units. (w) *Professor Markman*

218. Early Greek Art. A study of the problems of the origin and development of Greek art in the Geometric period to the end of the Archaic. 3 units. (w) *Professor Markman*

221-222. History of Aesthetics. Theories of art and beauty in the western world from antiquity to the present. Some attention will be given to the developed theories of aesthetics in the Far East. 6 units. (E) *Professor Patrick*

233. Early Mediaeval Architecture. The development of religious architecture from the time of Constantine to the end of the First Romanesque style in the third quarter of the eleventh century. 3 units. (E) *Associate Professor Sunderland*

234. Romanesque Sculpture. The development of sculpture in western Europe from the early Christian period through the culmination of Romanesque art in the west portal of Chartres Cathedral. 3 units. (E) *Associate Professor Sunderland*

239. Architecture of Britain. After a summary of recent archaeological activity in the British Isles, and a survey of Mediaeval building, the course deals principally with changing architectural problems and their solutions from the advent of the Renaissance onward. Attention is given to the interests of students majoring in history or literature. 3 units. (E) *Professor Hall*

240. Architecture of North America. A study illustrating the transplanation of European architectural customs since the sixteenth century; the time-lag in transit and acceptance of later European developments; the gradual assumption of confident independence in design; and the emergence of international leaders in the United States. 3 units. (E) *Professor Hall*

292. Research Problems in the Collections of the North Carolina Museum of Art. Students will meet once every week in the museum in Raleigh. Each student will submit a report on his particular research project. 3 units.* (E) *Adjunct Professor Bier*

Biochemistry and Nutrition

Professor Handler, *Chairman* (237 Bell Building); Associate Professor Fridovich, *Director of Graduate Studies* (244 Bell Building); Professors M. Bernheim, Davidson, Gross, Guild, Hill, Kamin, Tanford, Thiers, Wakil; Associate Professors Byrne, Kirshner, Lynn, McCarty; Assistant Professors Greene, Rosett, and Wheat

In the Department of Biochemistry graduate work is offered leading to the Ph.D. degree. A brochure may be requested from the department which describes the departmental facilities, the staff, the Ph.D. program, the special trainee stipends which are available to Ph.D. candidates in Biochemistry, and an M.D.-Ph.D. program.

Prerequisites are specified for each course, but interested students who cannot meet the requirements may be admitted by permission of the instructor.

For Seniors and Graduates

201. Introductory Biochemistry. Three lectures and one conference per week. A rigorous introduction to fundamental aspects of biochemistry which emphasizes chemistry of biologically occurring macromolecules, mechanism of enzyme action, energy transformations, metabolic pathways, and biochemical genetics. 6 units. *Professor Handler*

203. Chemistry of Natural Products. This course will emphasize the organic chemistry of carbohydrates, lipids and steroids; aspects of stereochemistry, conformational analysis and physical methods of structural investigation will be discussed. Prerequisite: chemistry through organic; Biochemistry 201 or its equivalent is suggested. 2 units. *Professor Davidson*

206. Laboratory Methods in Biochemistry. A laboratory course emphasizing the procedures and instruments of biochemical research. Each technique is employed in the course of a classical experiment demonstrating an important biochemical finding. Because the experimental materials are labile, one full day per week is spent in the laboratory. Prerequisite: Biochemistry 201 or equivalent. 2 units. *Assistant Professor Rosett*

For Graduates

301. Energy Metabolism. A lecture and seminar course on the metabolism of carbohydrates, lipids and biological oxidations; emphasizing energy production and utilization. Prerequisites: Biochemistry 201, 203 suggested. 3 units. *Professor Wakil and Assistant Professor Wheat*

302. Nitrogen Metabolism. An intensive study, in lecture and seminar, of the metabolism of inorganic nitrogen compounds, proteins, and their component amino acids. Prerequisite: Biochemistry 201. 2 units. *Professor Kamin, Associate Professor Kirshner and Assistant Professor Greene*

304. Proteins and Enzymes. The chemical and physical properties of proteins and enzymes. Thermodynamics, kinetics, and mechanisms of enzymecatalyzed reaction. Prerequisites: Biochemistry 201 and physical chemistry equivalent to Chemistry 261-262. 4 units. *Professors Tanford and Hill, and Associate Professor Byrne*

314. Nucleic Acids and Genetic Mechanisms. A lecture and seminar course on nucleic acids in biology with emphasis on the physical and chemical basis of their role as the structural units of heredity. Prerequisite: Biochemistry 201; 203 is suggested. 2 units. *Professors Guild and Gross*

345-346. Seminar. Required of all graduate students majoring in biochemistry. 1 unit each semester. *Associate Professor Fridovich*

348. Special Topics. A lecture series on topics of current interest in biochemistry. 1 or 2 units. *Associate Professor McCarty*

Botany

Professor Johnson, *Chairman* (141 Biological Sciences Building); Professor Naylor, *Director of Graduate Studies* (061 Biological Sciences Building); Professors Anderson, Billings, Harrar, Hellmers, Kramer, Naylor, Oosting, and Perry; Associate Professors Culberson, Philpott, and Wilbur; Assistant Professors Searles, Stone, and White

Graduate work in the Department of Botany is offered leading to the A.M. and Ph.D. degrees. Before undertaking graduate study in botany a student should have had in his undergraduate program at least 12 semester hours of botany beyond an elementary course, and related work in biological sciences. Some work in chemistry and physics will be desirable and, for some phases of botanical study, a necessity. Graduate Record Examination scores are required of all applicants. The student's graduate program is planned to provide a broad basic training in the various fields of botany, plus intensive specialization in the field of the research problem.

202. Genetics. The principles of heredity, their cytological basis, and their bearing on other fields of biology. Laboratory work involves experimental breeding of the fruit fly and interpretation of data from the breeding of plants. (Offered in alternate years.) Prerequisites: one year of botany, zoology, or equivalent, and one year of college mathematics. 4 units. *Professor Perry*

205. Anatomy. Intensive survey of vascular plant cell types, tissues and organs, with emphasis on the modern application of anatomy to problems of systematics and phylogeny. Laboratories will include microtechnique. Special project and term paper stressing current techniques and literature required. Prerequisite: Permission of instructor. 4 units. *Assistant Professor White*

209. Lichenology. The morphology, systematics, and biological and ecological implications of the lichens. Collection and identification of specimens and the use of lichen chemistry in taxonomy. Prerequisite: Two semesters of botany. 3 units. *Associate Professor Culberson*

210. Bryology. The morphological, systematic, and ecological characteristics of mosses and liverworts. 3 units. *Professor Anderson*

212. Phycology. The morphological and ecological characteristics of the common freshwater and marine species and the principles underlying their classification. Collecting, identification, and the making of permanent microscopical preparations. 3 units. *Assistant Professor Searles*

218. Comparative Morphology of Vascular Plants. Fundamental anatomical and morphological problems and theories in relation to vascular

plant evolution, with emphasis on comparative vegetative and reproductive characters as indicators of evolutionary trends. Laboratory work stresses basic techniques in preparation of materials, analysis of results and correlation with data in current literature. Prerequisite: Botany 55 or permission of instructor. 4 units. *Assistant Professor White*

221. Mycology. Field and laboratory study of the vegetative and reproductive structures of the fungi and slime molds. Methods of collection, isolation, propagation, and identification of the major orders as represented in the local flora. Prerequisite: one year of biological science. 4 units. *Associate Professor Johnson*

225-226. Special Problems. Students with adequate training may do special work in the following: (1) Mycology and Plant Pathology, (2) Cytology, (3) Ecology, (4) Genetics, (5) Morphology and Anatomy of Higher Groups, (6) Morphology and Taxonomy of Lower Groups, (7) Physiology, (8) Taxonomy of Higher Groups, (9) Microbiology, (10) Experimental Taxonomy and Evolution, (11) Phycology. Credits to be arranged. *All Members of the Graduate Staff*

240. Plant Evolution. Microevolutionary change and factors influencing its rate and direction, with primary emphasis on examples from the plant world. 3 units. *Assistant Professor Stone*

242. Systematics. A general survey of the principles of vascular plant taxonomy, with practice in identification and collection. Special project or term paper required. Lectures, laboratories, and field trips. Prerequisite: Permission of instructor. 4 units. *Associate Professor Wilbur*

243. Cytology. The structure and functional organization of cells. Lectures, readings, and laboratory work. Prerequisite: one year of botany or zoology. (Listed also as Zoology 243.) 4 units. *Professor Anderson*

245. Morphology. Comparative survey of vegetative organization and reproductive cycles in the modern flora, with emphasis on evolutionary origin and phylogeny. Special project and term paper required. Lectures, laboratories and field trips. Prerequisite: Permission of instructor. 4 units. *Associate Professor Culberson*

246. Ecology. Intensive study of the environmental effects on growth and distribution of plants at the level of the individual, the population, and the ecosystem. A term paper will be required. Lectures, laboratories and field trips. Prerequisite: Permission of instructor. 4 units. *Professor Billings*

251. Physiology. A general survey of the major physiological processes in plants, including food syntheses, growth and water relations. Special project and term paper required. Lectures, laboratories, and readings. Prerequisite: Permission of instructor. 3 units. *Professor Kramer*

252. Plant Metabolism. The physiochemical processes and conditions underlying the physiological processes of plants. Prerequisite: Botany 151 or equivalent; organic chemistry recommended. 4 units. *Professor Naylor*

254. *Plant Water Relations.* A study of factors affecting the availability of water, its absorption and use in plants, and the effects of water deficits on plant processes. Assigned readings, reports, and lectures. Prerequisite: Botany 151 or equivalent. 3 units. *Professor Kramer*

255. *Plant Systematics.* A study of the historical background of plant taxonomy, modern concepts and systems of classifications, nomenclatorial problems, and the taxonomy of specialized groups. Prerequisite: two years of botany, including Botany 52 or equivalent. 4 units. *Associate Professor Wilbur*

256. *Community Analysis and Classification.* The development of concepts and methods in synecology and their present application to the study of plant communities. Prerequisite: Botany 156 or equivalent. 3 units. *Professor Oosting*

257. *Principles of Plant Distribution.* Interpretation of floristic and ecological plant geography of world vegetation. Prerequisite: Botany 156 or equivalent. 3 units. *Professor Billings*

258. *Physiology of Growth and Development.* Consideration of the internal factors and processes leading to the production of new protoplasm and its differentiation at the cellular, tissue, and organ level in plants. Prerequisites: Botany 151 or equivalent; organic chemistry recommended. 4 units. *Professor Naylor*

259. *The Environment.* Environmental principles and methods of obtaining and evaluating climatological data for ecological purposes with special attention to instrumentation and microclimate. Prerequisite: Botany 156 or equivalent. 3 units. *Professor Billings*

305. *Vegetation of North America.* Distribution and limits of the major plant communities, a study in ecological plant geography. Prerequisite: Botany 156 or equivalent. 3 units. *Professor Oosting*

359-360. *Research in Botany.* Individual investigation in the various fields of botany. Credits to be arranged. *All Members of the Graduate Staff*

Marine Laboratory

Three marine botany courses are given in the Duke University Marine Laboratory, Beaufort, N. C., one each summer in sequence: S205, Marine Microbiology (Not 1966); S207, Marine Mycology (1966); S211, Marine Phycology (Not 1966); S220 Coastal Field Botany (Not 1966).

Chemistry

Professor Bradsher, *Chairman* (115 Chemistry Building); Associate Professor Quin, *Director of Graduate Studies* (09 Chemistry Building); Professors Brown, Hauser, Hill, Hobbs, Krigbaum, Saylor, Strobel, and

Wilder; Associate Professors Chesnut, Poirier, and Smith; Assistant Professors Jeffs, Jones, Palmer, Toren, and Wells; Adjunct Professors Peterlin and Stannett

In the Department of Chemistry graduate work is offered leading to the A.M. and Ph.D. degrees. Before undertaking a graduate program in chemistry, a student should have taken an undergraduate major in chemistry, along with related work in mathematics and physics.

Graduate courses in the department are designed to provide a broad basic training in the fields of inorganic, organic, analytical, and physical chemistry. An important requirement for the Ph.D. degree is the successful completion, under the direction of a member of the staff, of a research program leading to the solution of an original problem. The choice of the research problem, for either the A.M. or the Ph.D. degree, will determine the field of advanced specialization.

For Seniors and Graduates

206. *Elements of Theoretical Chemistry.* A one-semester course in the general principles of physical chemistry. Credit is not given for both 206 and 161-162. Three recitations and three laboratory hours. Prerequisites: quantitative analysis, organic chemistry 8 units, physics 8 units, and introductory calculus. With the permission of the Director of Graduate Studies, graduate students from other departments may offer other advanced science courses in lieu of some of these prerequisites. 4 units.

Professor Saylor

216. *Nuclear Chemistry.* Elementary theory of nuclear reactions, properties of isotopes, and tracer techniques. Two lectures and three laboratory hours. Prerequisites: Introductory physics, analytical and organic chemistry. 3 units. *Professor Hill*

234. *Chemical Instrumentation.* Discussion of physico-chemical principles as applied to instrumental methods of analysis, illustrated by laboratory experiments with emphasis on methods involving electrical techniques. One lecture and three laboratory hours per week. Prerequisites: quantitative analysis and physical chemistry; the latter may be taken concurrently. 2 units. *Professor Strobel and Assistant Professor Toren*

235. *Advanced Analytical Chemistry.* A theoretical and applied treatment of chemical kinetics, electrode processes, multistage separations, organic reagents, and functional group chemistry as related to modern analytical techniques. Prerequisites: Chemistry 132 and 162. 3 units. *Assistant Professor Toren*

251. *Qualitative Organic Analysis.* Systematic identification of organic compounds based upon a study of physical and chemical properties. Infrared and ultraviolet absorption spectra are used in elucidation of structure. One lecture and three or six laboratory hours per week. Prerequi-

sites: Quantitative Analysis and Chemistry 152. 2 or 3 units. *Associate Professor Quin*

252. Advanced Organic Preparations. A laboratory course designed to supplement the student's knowledge of fundamental organic processes by a selected group of laboratory exercises accompanied by oral discussions of techniques and theories pertinent to the experiments. Five hours laboratory and lecture, with lectures in alternate weeks. Prerequisites: quantitative analysis and 8 units of organic chemistry. 2 units. *Professor Brown*

253. Intermediate Organic Chemistry. An advanced study of the reactions of organic compounds and the theories of organic chemistry. Prerequisite: 8 units of organic chemistry. 3 units. *Associate Professor Quin*

265. Inorganic Chemistry. An advanced study of bonding, structures, and reactions of inorganic compounds based on modern physical chemical concepts. Three lectures. Prerequisite: Chemistry 162. 3 units. *Assistant Professor Wells*

271. Introduction to Research. Lectures on the use of chemical literature, research methods, recording and publication of results, and other topics. One lecture per week. 1 unit. *Professor Brown*

275, 276. Research. The aim of this course is to give instruction in methods used in the investigation of original problems. Individual work and conferences. 1 to 6 units. *All Members of the Graduate Staff*

For Graduates

303. Thermodynamics. Fundamental laws of thermodynamics and their application to chemistry. Prerequisites: Physical chemistry and one year of calculus. 3 units. *Professor Saylor*

304. Physical Chemistry of Reactions. The theoretical aspects of reaction kinetics, chemical equilibrium, atomic and molecular forces, and the relation of these to chemical reactions are considered. Prerequisite: Physical chemistry. *Associate Professor Smith*

306. Special Topics in Physical Chemistry. An introduction to the theory and to the application to physico-chemical problems of statistical thermodynamics, molecular spectroscopy, nuclear and electron magnetic resonance spectroscopy, intra- and inter-molecular interactions, and other selected topics.

Registration for other than chemistry graduate students by permission of the instructor. 3 units. *Professor Hobbs*

315. Advanced Inorganic Chemistry. Intensive treatment of a few particular areas of modern inorganic chemistry. Mechanisms of inorganic reactions and solid state chemistry are included, but topics to be considered may be chosen to suit the interests of the group. Prerequisite: Chemistry 265. 3 units. *Professor Hill*

331, 332. Seminar in Analytical and Inorganic Chemistry. Lectures, oral reports, and discussion on advanced topics and recent advances in the allied fields of analytical and inorganic chemistry. Prerequisites: Chemistry 215 and 234. 2 units. *Professors Hill and Saylor*

342. Advanced Organic Chemistry. Consideration is given to principles, theories and mechanism, as well as the usefulness in reactions, of organic reactions involving basic and acidic reagents. Prerequisite: Chemistry 253. 2 units. *Professor Hauser*

350. Organic Reactions. A study of the scope and limitations of the more important types of reactions of organic chemistry from the point of view of their practical use in the synthesis of organic compounds. Prerequisite: Chemistry 253. 2 units. *Professor Bradsher*

352. Mechanisms of Organic Reactions. Mechanisms of various organic reactions are considered. Lecture or seminar one hour each week. Prerequisite: Chemistry 342. 1 unit. *Professor Hauser*

353. Special Topics in Organic Chemistry. Selected topics in physical organic chemistry with particular reference to mechanistic and structural problems. 2 units. *Professor Wilder*

354. Stereochemistry. A study of recent advances in stereochemistry of organic compounds including conformations and stereospecific reactions. The use of spectrophotometric methods for the determination of structure will be discussed. Prerequisites: Chemistry 251 and 253. 2 units. (Not 1966-67.) *Professor Wilder*

360. Polymer Chemistry. A survey of the methods of preparation of high-molecular-weight organic compounds and a study of the properties characteristic of macromolecules in solution and in the solid state. Prerequisite: Chemistry 303. 2 units. *Professor Krigbaum*

361. Advanced Polymer Chemistry. A number of topics in the chemistry and physics of high polymers will be discussed, including polymerization mechanisms and kinetics, crystallization and morphology of high polymers and solution properties. Prerequisite: Chemistry 360. 2 units. *Adjunct Professors Peterlin and Stannett*

363, 364. Seminar in Physical Chemistry. Various topics in Physical Chemistry which are of special interest to the staff or students are considered such as absorption and scattering of light, dielectric phenomena, electrode processes, electrolyte theory, ion exchange, molecular structure and solubility. Seminar. Prerequisites: Physical chemistry and Chemistry 303. 2 units. *Professors Hill, Hobbs, Krigbaum, Saylor, and Strobel*

365, 366. Chemical Physics, Statistical Theory. General introduction to classical and quantum statistical mechanics and applications to chemical problems including: calculation of thermodynamic functions of gases, liquids and solids; solution theory; reaction velocity; and changes of state. 6 units. (365, Not 1966-67; 366, Fall 1966).

367, 368. Chemical Physics, Quantum Theory. General introduction of the quantum theory of atomic and molecular forces and the structure of

matter. 6 units. (367, Spring 1967; 368, Not 1966-67). *Assistant Professor Jones*

373, 374. Seminar. Required of all graduate students in chemistry. One hour a week discussion. 2 units. *All Members of the Graduate Staff*

Classical Studies

Professors Marti, Rogers, Truesdale, and Willis; Assistant Professor Strugnell

Greek

For Seniors and Graduates

257. Social and Cultural History of the Hellenistic World from Alexander to Augustus. Lectures, reading, and discussions. This course will not be separately credited without the sequel, Latin 258. 3 units. *Professor Rogers*

Latin

For Seniors and Graduates

205-206. Mediaeval Latin. Reading of selections from representative writers in prose and poetry. Practice in dealing with microfilms of mediaeval Latin texts. 6 units.* *Assistant Professor Strugnell*

211-212. Roman Oratory. A survey of the history of Roman oratory, centering about the *Brutus* of Cicero and Tacitus' *Dialogus*. 6 units.* *Professor Rogers*

258. Social and Cultural History of the Graeco-Roman World. The Roman Empire as the trustee of Hellenism and Christianity, and its own original contributions to modern civilization; lectures, readings, and discussions. This course continues Greek 257 and will not be separately credited. 3 units. *Professor Rogers*

Related Courses in Other Departments

Philosophy 217; Religion 217, 313, 316, 318.

Under the terms of a co-operative agreement graduate students of Duke University may, with the approval of the chairman of their major department, take any graduate course offered by the Department of Greek and Latin of the University of North Carolina by the payment of a nominal fee. A list of these courses will be sent upon request.

Graduate students of Duke University may attend the American School

of Classical Studies in Athens, Greece, without charge for tuition, and they are eligible to compete for the fellowships that are offered annually by the School. These consist of two fellowships in Greek archaeology, and one in the language, literature, and history of ancient Greece, each with a stipend of \$2,000. They are awarded mainly on the basis of examination held in the beginning of February of each year. A somewhat similar connection exists with the American Academy in Rome.

Comparative Literature

No graduate degree is offered in Comparative Literature. The following courses may serve in the minor programs of students in other departments. Professor Salinger is Chairman of the Department of Germanic Languages and Literature.

201, 202. *Romanticism.* Studies in the origin, rise and development of the Romantic Movement in the chief literatures of the Western World. The approach is comparative; the principal emphasis will be on England, France, and Germany with some reference to other countries. Selected subjects will occasionally be covered in lectures by speakers from various departments of the University. 6 units (1966-67). *Professor Salinger*

203, 204. *Realism and Symbolism.* Comparative studies in the literatures of England, France, Germany, Russia, the Scandinavian countries, Spain and Italy, tracing the decline of romantic individualism and the reappraisal of man's significance against the social background. Selected subjects will occasionally be covered in lectures by speakers from various departments of the University. 6 units. (Not 1966-67). *Professor Salinger*

205. *Foundations of Twentieth-Century European Literature.* The roots of the contemporary scene (Proust, Mann, Rilke, Kafka, Eyvind Johnson, Anouilh, Lagerkvist, Camus) evolving toward a mythology of man. 3 units.* *Professor Salinger*

(See also Germanic Languages and Literature 206, Middle High German: The Arthurian Romance in Germany.)

Economics

Professor Smith, *Chairman* (306 Social Science); Associate Professor Yohe *Director of Graduate Studies* (313 Social Science); Professors Black, de Vyver, Ferguson, Hanna, Hoover, McGee, Rottenberg, and Spengler; Associate Professors Blackburn, Davies, De Alessi, Gerhard, and Goodwin; Assistant Professors Naylor and Wallace

The Department of Economics offers graduate work leading to the A.M. and Ph.D. degrees. A student entering graduate work in economics should

have completed with satisfactory grades at least 12 semester hours of undergraduate work in economics, including 6 hours of Principles of Economics. Among the undergraduate courses of distinct advantage to the graduate student in economics are General Accounting, Elementary Statistics, Intermediate Economic Theory, Money and Banking, International Trade, and basic courses in philosophy, psychology, mathematics, and social sciences other than economics.

Requirements for the Ph.D. in economics include a core of courses in Mathematical Economics, Statistical Methods, Micro- and Macroeconomic Theory, Economic History, and the History of Economic Thought. Economic Growth and Demography, Money and Banking, International Trade, Economic Systems, Labor Economics, Public Finance, and Industrial Organization are optional fields, of which the student elects at least three in preparation for the preliminary doctoral examination. Course requirements for the Ph.D., including a minor field, may be completed in four semesters of residence.

For Seniors and Graduates

218. *Business Cycles.* The characteristics and measurement of cyclical fluctuations in output, employment, and prices; an historical survey of business cycle theories, modern macroeconomic theory and public policy as they relate to business cycles and associated problems of economic growth; techniques of forecasting cycles. 3 units.† *Associate Professor Yohe*

233. *State and Local Finance.* A study of expenditures, taxation, and financial administration in state and local governments with emphasis on current problems. Special attention will be given to research methods and materials and to the financial relations between state and local governments. 3 units.† *Associate Professor Davies*

237-238. *Statistical Methods.* A study of statistical methods appropriate for dealing with problems in business and the social sciences. In addition to developing more thoroughly the subject considered in *Business Statistics*, the following methods will be considered: multiple, partial, and curvilinear correlation; curve fitting; probability; sampling distributions; and statistical inference. Prerequisite: Economics 138 or consent of the instructor. Either semester may be taken for credit. 6 units. *Professor Hanna and Assistant Professor Wallace*

243. *Econometrics I.* Economic theory, mathematics, statistical inference, and electronic computers applied to analysis of economic phenomena. Objective is to give empirical content to economic theory. Matrix algebra used to develop topics in inference, linear regression, and systems of simultaneous equations. Use is made of the electronic computer. 3

† Graduate students in Economics normally will not receive credit for courses so marked. These courses may be taken for credit by non-Economic graduate students, with the consent of the instructor.

units. *Assistant Professor Naylor*

244. *Econometrics II.* A course on the design of computer simulation experiments for economic systems. Topics include generation of stochastic variates, computer models of queueing and inventory systems, models of the firm and industry, models of the economy, simulation languages, and experimental design. 3 units. *Assistant Professor Naylor*

262. *Trade Unionism and Collective Bargaining.* An intensive survey of the trade union as an economic institution is followed by a study of the principles and problems of union-management relationship as found in collective bargaining. 3 units.† *Professor de Vyver*

265. *International Trade and Finance.* A study of the fundamental principles of international trade and foreign exchange. Subjects covered will include international specialization, balance of payments, foreign investments, tariffs and commercial policies, exchange control, exchange rates, and international monetary problems. 3 units.† *Associate Professor Gerhard*

275-276. *Advanced Industrial Accounting and Management.* A comprehensive examination of the rationale and techniques of control methods used in industry. Emphasis is laid on a critical evaluation of the practices followed by job-order, process, and standard costing, as well as the economics of overhead costs. Prerequisites: Economics 171-172 and permission of the Department. 6 units. *Professor Black*

301. *Economic Analysis.* Review of contemporary theory relating to consumer behavior, production, the firm, price formation, income distribution, and equilibrium. 3 units. *Associate Professor De Alessi*

304, 305. *Seminar in Money and Banking.* 3 units each. *Associate Professor Yohe*

307. *Quantitative Analysis, I.* A systematic analysis of the principal quantitative methods used in microeconomic theory. Neo-classical theories of production and distribution are used as vehicles for presenting the material. Considerable emphasis is placed on the application of mathematical analysis to economic models. 3 units. *Professor Ferguson*

308. *Quantitative Analysis, II.* Linear economic models, particularly Leontief models, are used in the exposition. Primary emphasis is placed on the application of mathematics to economic theory. Prerequisite: Economics 307 or consent of instructor. 3 units. *Professor Ferguson and Assistant Professor Naylor*

311, 312. *History of Political Economy.* A detailed review of the development of economic theory, the tools of economic analysis, and economics as a science, together with an analysis of the circumstances affecting this development. Period covered: pre-Christian times through 1936. 6 units. *Professor Spengler*

313-314. *Seminar in Economic Theory.* The course consists of directed

† Graduate students in Economics normally will not receive credit for courses so marked. These courses may be taken for credit by non-Economics graduate students, with the consent of the instructor.

research in economic theory. The primary purpose is the correction of authoritative eclecticism and its replacement by individually integrated theory. Prerequisite: Economics 301 or its equivalent. 6 units. *Professors Hoover and Ferguson*

315. *Seminar in Economic Systems.* 3 units. *Professor Hoover*

316. *Seminar in Economic Functions of the State.* 3 units. *Professor Hoover*

317. *Seminar in Demographic, Population, and Resource Problems.* 3 units. *Professor Spengler*

319. *Seminar in the Theory and the Problems of Economic Growth and Change.* 3 units. *Professors Rottenberg and Spengler*

320. *Seminar in Trade Cycle, Employment, and Income Theory.* 3 units. *Associate Professors Blackburn and Yohe*

329. *Federal Finance.* A study of the expenditures, revenues, and financial administration of the government of the United States, with emphasis on current problems. Special attention given to budgetary procedure, corporate and individual income taxes, and the financial relations between federal and state governments. 3 units. *Associate Professor Davies*

330. *Seminar in Public Finance.* 3 units. *Associate Professor Davies*

331. *Seminar in Economic History.* 3 units. *Professor Smith*

340. *National Income.* A critical survey of the conceptual framework and structure of national income and its components, the reliability of national income estimates, and their use in analyzing questions of economic policy. 3 units. *Professor Hanna*

355. *Seminar in Labor Economics.* 3 units. *Professor de Vyver*

358. *Seminar in Labor Market and Related Analysis.* 3 units. *Professor Rottenberg and Associate Professor Goodwin*

365. *Seminar in International Trade.* 3 units.

366. *Seminar in Problems in International Trade and Finance.* The seminar will discuss selected topics of current interest, such as the European Common Market, international commodity agreements, migration of labor, amending the IMF charter, and the U.S. gold drain. Prerequisite: Economics 365 or equivalent. 3 units. *Associate Professor Gerhard*

386. *Seminar in Latin-American Economic Problems.* 3 units. *Professor Smith*

388. *Industrial Organization.* The theory, measurement, and history of the firm-structure of industry. Emphasis upon the structure of American industry and upon actual production and pricing practices. Criteria for evaluating industrial performance. 3 units. *Professor McGee*

389. *Seminar in Industrial and Governmental Problems.* 3 units. *Professor McGee*

401. *Seminar on the British Commonwealth.* 3 units. *Professors Spengler, Cole, and Hamilton*

Related Courses in Other Departments

Courses comprising a candidate's minor may be selected from fields of forestry, history, mathematics, philosophy, physics, political science, psychology, and sociology and anthropology, or from an area that complements the candidate's area of research interests in economics.

Education

Professor Nelson, *Chairman* (o8D West Duke Building); Professor Bolmeier, *Director of Graduate Studies* (o8D West Duke Building); Professors Bowman, Cartwright, Githens, Hopkins, Hurlburt, Petty, and Stumpf; Associate Professors Colver, Gehman, Rudisill, Shuman, Sublett, and Weitz; Assistant Professor Martin

For Seniors and Graduates

Graduate work in Education is offered leading to the A.M., the M.Ed., the M.A.T., and Ed.D. degrees. For each of these degrees there are specific requirements and prerequisites, all of which may be found stated in detail in this *Bulletin*, pp. 16-25. Department requirements and prerequisites for all of these degrees may be obtained from the Director of Graduate Studies.

From the courses listed below, plus several in related disciplines, a selection may be made which will meet North Carolina requirements for the Advanced Principal's Certificate and the Superintendent's Certificate.

(Some courses below are offered only in the Summer Session; see the Summer Session *Bulletin*.)

Accredited by the National Council for Accreditation of Teacher Education for the preparation of elementary and secondary school teachers and school service personnel with the Doctor's degree as the highest degree approved.

201. *Teaching and Supervision of Arithmetic.* This course gives special attention to the number system, the fundamental operations (with whole numbers, fractions, and decimals), percentage, and measurements. The course will consider the meaning theory, method of teaching, problem solving, evaluation, practice and drill, and selection and gradation of arithmetical contents. The course is designed for teachers and supervisors in the elementary school. 3 units. *Professor Petty*

203. *Principles of School Administration.* The fundamental facts and procedures of school administration, and analysis of the problems and policies of the organization and direction of a local school system, and the functions of the various school officials. 3 units. *Professors Bolmeier, Hurlburt, and Stumpf*

204. *The School as an Institution.* Consideration is given to the place

of the school in the American social order, and its adaption to social, economic, and political changes. Special attention is directed to the responsibility (1) of the school for seeking solutions to the perplexing problems of youth created by a changing society; and (2) of the government for providing greater equality of educational opportunity. 3 units. *Professors Bolmeier and Nelson and Assistant Professor Martin*

205. Curriculum Problems in Secondary Education. A consideration of the aims and objectives of secondary-school subjects, emphasizing practical problems of curriculum-making in the high school. 3 units.* *Professor Cartwright*

210. Introduction to Educational Research. The general purpose of this course is to give the student an overview of research, acquaint him with the nature of research processes, and develop within him an appreciation of the essential characteristics of good research. 3 units. *Professor Stumpf*

211. The Problem Child (also listed as Psychology S211). Study of problem behavior and adjustment in children with emphasis on the causes and treatment of conduct and neurotic disorders of the maladjusted child. Particular attention will be paid to mental hygiene principles in the handling of problem children in school and home. 3 units.

213. Elementary-School Organization and Administration. This course is designed especially for principals, teachers, and other prospective members of the elementary-school staff. The scope of elementary education is considered to encompass nursery school, kindergarten, and the elementary school. Special treatment is given to the problems of internal organization and management of the elementary school, and its integration with the secondary-school level. 3 units.* *Professor Stumpf and Associate Professor Sublett*

215. Secondary Education: Principles. Intensive study of principles, curriculum, and methods in secondary education. Accelerated course meeting six hours a week for half a semester. Must be accompanied by Education 216. 3 units. *Professors Cartwright, Githens, and Hurlburt; Associate Professors Shuman and Sublett*

216. Secondary Education: Internship. Supervised internship in junior or senior high schools. Full-time observation and teaching for half a semester, accompanied by Education 215; or, with permission of the Department, full-time teaching for a semester, accompanied by Education 315. Students carrying Education 216 for credit toward a master's degree will be required to take six hours of senior or graduate work in addition to the normal degree requirements. 6 units. *Professors Cartwright, Githens, and Hurlburt; Associate Professors Shuman and Sublett*

217. The Psychological Principles of Education. An advanced study of teaching, learning, and the learner. Selected problems guiding the reading of students will be discussed in class. 3 units. *Associate Professors Gehman and Weitz*

222. *The Curriculum and Materials of the Elementary Grades.* A study of curriculum problems in the elementary schools. 3 units.* *Professor Hurlburt and Associate Professor Sublett*

224. *Teaching the Social Studies in Elementary Schools.* This course will treat objectives, curriculum trends, methods, and materials in elementary-school social studies. Topics to receive emphasis include unit-planning, use of the textbook, the reading program, using community resources, audio-visual materials, dealing with controversial issues, teaching time and place concepts, and evaluation. Opportunity will be provided for teachers to work on their own school problems in the social studies. 3 units. *Professor Cartwright*

225. *The Teaching of History and the Social Studies.* Evaluation of the objectives, content, materials, and methods in the teaching of history and the social studies. 3 units. *Professor Cartwright*

226. *Teaching Reading in the Elementary School.* A study of the nature of the reading process and of principles, methods, and materials for the development of effective reading attitudes and skills as applied both to developmental and remedial programs. 3 units. *Associate Professor Rudisill*

228. *Improvement of Instruction in the Social Studies.* An advanced treatment of curriculum, methods, and materials in the social studies. Individuals will concentrate on subjects and grade levels of their choice. 3 units. *Professor Cartwright*

232. *Supervision of Instruction.* The survey of supervision as a means of improving instruction and adapting the curriculum to the learner and to community needs. 3 units.* *Professor Hurlburt*

234. *Secondary-School Organization and Administration.* This course is designed especially for principals, teachers, and other prospective members of the secondary-school staff. The scope of secondary education is considered to encompass junior high school, regular high school, senior high, and junior college. Special treatment is given to the problems of internal organization and management. 3 units. *Professors Bolmeier and Nelson*

235. *The Nature, Function, and Reorganization of the Curriculum.* Selected problems guiding the reading of students. 3 units. *Professor Cartwright and Associate Professor Sublett*

236. *Teaching Reading in the Secondary School.* A study of the nature of the reading process and of principles, methods, and materials for the development of effective reading attitudes and skills as applied both to developmental and remedial programs. The course provides practice with secondary-school children suffering reading retardation, including testing, diagnosis, and daily remedial teaching during a six-week period. For secondary-school teachers of all subjects who wish to improve the reading and study habits of their students. 3 units. *Associate Professor Rudisill*

237. Literature for Adolescents. This course offers a critical survey of literature written for, or appropriate for junior and senior high school students. Fiction, non-fiction, biography, poetry, and drama are examined. Both adult and transition-type literature are considered. Methods of organizing the program in literature are explored. 3 units. *Associate Professor Shuman*

238. Remedial Reading—Principles and Practice. A study of the basic causes of reading disability and of principles, methods, and materials for the diagnosis and correction of specific difficulties. The course provides practice with grade school children suffering reading retardation, including testing, diagnosis, and daily remedial teaching during the six-week period. A basic course in the psychology of teaching of reading is prerequisite, or Education 226 may be taken concurrently. 3 units. *Associate Professor Rudisill*

239. Methods and Problems of Teaching English in Secondary Schools. This course will present sound methods of teaching the reading of literature and other forms of writing, language, grammar, and composition. Materials will include selections found in widely adopted textbooks, numerous specimen themes for grading, and current books and articles in the field. Several short compositions and a report will be required. 3 units. *Professor Bowman and Associate Professor Shuman*

240. Educational and Occupational Information. A study of the sources of occupational and educational information: methods of securing and organizing occupational information; methods of providing vocational and educational information to students through career days, college conferences, class activities, and individual counseling; methods of making job analyses and community occupational surveys. 3 units.* *Associate Professor Colver*

241. Principles of Guidance. An historical survey of the philosophies of guidance; a study of the interrelationships between instruction, administration, and guidance in education. Prerequisite: 6 hours of psychology or educational psychology. 3 units. *Associate Professor Colver*

242. Measurement of Aptitudes, Interest, and Achievement. A study of the theories and principles of psychological measurement as applied to aptitude, interest, and achievement testing (also listed as Psychology 242). Prerequisite: 12 hours of psychology or educational psychology (6 hours of which may be taken concurrently). 3 units.

243. Personality Dynamics. A study of personality structure and dynamics with emphasis upon the implications for counseling and instruction. Prerequisite: 6 hours of psychology or educational psychology. 3 units. *Associate Professor Gehman*

244. Counseling Techniques. A study of individual counseling techniques including diagnosis, interviewing, program planning, and counseling evaluation. Prerequisites: Education 243 and 258 or equivalent, which may be taken concurrently. 3 units. *Associate Professor Gehman*

246. *The Teaching of Mathematics.* This course deals with such topics as aims, curriculum, course and lesson planning, and classroom procedure for teaching secondary-school mathematics. 3 units. *Associate Professor Reynolds*

248. *Practicum in Counseling.* Practice in individual counseling, including test administration, intake interviewing, diagnosis, counseling, program planning, report preparation, and evaluation. The student will be expected to devote about 150 hours to case work and conferences with his supervisor. Prerequisite: Education 244. 3 units. *Associate Professor Weitz*

249. *Introduction to Exceptional Children.* Survey course in special education covering the educational, psychological, medical and social aspects of exceptional children. Field experiences including emotionally disturbed, mentally retarded, neurologically impaired, physically handicapped, crippling and special health conditions, socially and culturally deprived and gifted children. (Opportunities for attendance at psychiatric, psychological, and educational demonstrations with exceptional children.) 3 units. *Assistant Professor Stedman*

250, 251. *Teaching Emotionally Disturbed Children: Internship.* Basic principles and practices in teaching and the organization of instructional materials. Work with children under the supervision of a certified teacher of emotionally disturbed children. Experience in general classroom teaching and small group and individualized instruction. Participation in staff conferences involving psychiatrists, psychologists, social case workers, and professional educators. 3 units each semester. *Associate Professor Gehman*

252. *The School in the Legal Structure.* Designed to show the legal relationships of the school to federal, state, and local governments. Considerable attention to legal rights, responsibilities, and liabilities of the teacher. Not open to those who have had Education 253. 3 units.* *Professor Bolmeier*

253. *School Law.* The primary purpose of this course is to familiarize prospective school administrators and teachers with the legal features of school organization and administration. Although some attention is given to constitutional and statutory provisions, the main emphasis is upon court decisions relating to education. Students are expected to select appropriate problems in school law for intensive study. 3 units. *Professor Bolmeier*

258. *Educational Measurements.* A critical study of the principles and techniques involved in measurement in education, with opportunity for individual research. Prerequisite: twelve semester hours in the Department, including a course in educational psychology. 3 units. *Associate Professors Colver and Weitz*

266. *Science in the Elementary School.* Presentation of basic concepts

in natural and physical science through selected readings, the use of simple experiments and demonstrations, construction and use of equipment, and field studies. 3 units.* *Professor Githens*

276. *The Teaching of High-School Science.* Discussion, lectures and collateral reading, related to such topics as aims, tests, curriculum, classroom and laboratory procedure, field trips, course and lesson planning for secondary-school science. 3 units. *Professor Githens*

285. *Audio-Visual Aids in Education.* The aims and psychological bases of audio-visual materials in the classroom. Attention to such materials as charts, filmstrips, flat pictures, maps, models, motion pictures, radio, records, slides, and television. 3 units.*

290. *Administration of School Property.* Planning and management of the school plant and its equipment to meet instructional, health, and community needs for immediate and long-range purposes. This course is intended for teachers, principals, and superintendents. Areas to be treated will include site selection; trends in design, lighting, ventilation, and heating; custodial service and maintenance; and financing. 3 units.* *Professor Stumpf*

291. *Public and Community Relations of Schools.* A study of the relationships between the entire school or school system and the several publics, especially to the community of a given school. Media for interpreting needs and views of the school to the public and vice-versa will be explored. The study applies to both public and private schools. 3 units. *Professor Stumpf*

For Graduates

315. *Seminar in Secondary-School Teaching.* Advanced-level consideration of principles, practices, and problems in secondary-school instruction. Designed particularly to accompany an internship. For students without previous internship credit, this course must be accompanied by Education 216. 3 units. *Professors Hurlburt and Nelson*

323. *Public School Finance.* A study of educational costs, sources of revenue for the support of public education, collection of revenue, basis of distribution, and accounting for funds spent. 3 units.* *Professor Stumpf*

333. *Seminar in Higher Education.* An examination of current problems in American higher education, with special emphasis on case studies in organization, administration, and evaluation. For graduate students interested in the administration of higher education or college teaching with consent of the instructor. 3 units. *Professor Hopkins*

335-336. *Seminar in School Administration.* Organization and control over public education. During the first semester special attention is given to "external control" such as is exercised by various branches and levels of government and by professional and lay groups. "Internal control" as this

relates to the principal, the teaching staff, and methods of classroom control, is considered in the second semester. 6 units each semester. *Professors Bolmeier, Hurlburt, Nelson, Petty, and Stumpf*

350, 351. *Directed Activities in School Administration.* This course will satisfy, in part, requirements for the Superintendent's or Advanced Principal's Certificate. It involves work on an administrative project approved and supervised by the instructor. Open only to school administrators. 3 units each semester. *Professors Bolmeier, Hurlburt, Petty, and Stumpf*

354. *Seminar in School Law.* Open to students who have completed Education 253 or its equivalent and are working or plan to work on doctoral dissertations or masters' theses of a legal nature. Reports on research projects and recent court cases. 3 units.* *Professor Bolmeier*

Engineering

James Lathrop Meriam, Ph.D., *Dean*; Charles Rowe Vail, Ph.D., *Associate Dean for Graduate Study and Research* (136 Engineering)

The College of Engineering offers programs of study and research leading to the degrees of Master of Science with a major in civil, electrical, or mechanical engineering and Doctor of Philosophy with a major in civil or electrical engineering. These programs are designed to provide a fundamental understanding of the science of engineering, which is based on mathematics and the physical sciences, as well as a basic understanding of the art of engineering, which depends on human imagination and judgment. Each Engineering graduate student participates in seminars appropriate to his field of study.

A *minimum* of 30 units of earned graduate credit beyond the Bachelor's degree is required for the M.S. degree: 12 in engineering, 6 in related minor work (normally mathematics or natural science), 6 in either the major or minor subject or in other areas approved by the major department and the Dean of the College of Engineering, and 6 for a research-based thesis. There is no language requirement for this degree.

A *minimum* of 60 units of earned graduate credit beyond the Bachelor's degree is required for the Ph.D. degree: 24 in engineering, 12 in related minor work (normally mathematics or natural science), 12 in either the major or minor subject or other areas approved by the major department and the Dean of the College of Engineering, and 12 for a research-based dissertation. In addition, a reading knowledge of two foreign languages which are relevant to the field of the dissertation is required (normally two of the following: French, German, or Russian). The Directors of Graduate Studies will, during the first period of full-time registration of each doctoral aspirant, appoint a Program Advisory Committee consisting

of three members of the Graduate faculty in areas relevant to the student's intended major. The preliminary examination must contain an oral component of approximately two hours' duration and may, at the discretion of the Committee, include a written component.

Civil Engineering

Professor Brown, *Chairman and Director of Graduate Studies* (121 Engineering); Professors Abeles (visiting), Bryan, Meriam, and Vesic; Associate Professors Hill and Kumar; Assistant Professors Barton, Harrawood, and Wood

A student may specialize in one of the following fields of study for either the M.S. or the Ph.D. degree with a major in Civil Engineering: engineering mechanics, hydraulic engineering, materials science, sanitary engineering, soil and foundation engineering, or structural engineering. Appropriate combinations of these fields are also encouraged. Each graduate student participates in seminars appropriate to his field of study.

Under the Reciprocal Agreement with the Consolidated University of North Carolina, a student may include as a portion of the minimum requirements work offered by the Department of Environmental Sciences and Engineering of the University of North Carolina. Although minor work normally is taken in the natural sciences or mathematics, a student whose major interest relates to the social sciences may take relevant minor work in this area.

A minimum prerequisite to the graduate program in civil engineering is a basic knowledge of mathematics through linear differential equations, materials science, solid mechanics, and fluid mechanics.

CE 201. *Advanced Mechanics of Materials.* Analysis of structural elements described by ordinary differential equations, such as beams on an elastic foundation, curved beams, beam-columns, circular plates; introduction to plates and shells; energy principles and their use in structural analysis. 3 units. *Associate Professor Hill*

CE 202. *Experimental Stress Analysis.* The experimental analysis of stress and strain in deformable bodies, correlation of theory with data from experiments; photoelasticity; strain gauges; dimensional analysis and similitude principles of models. 3 units. *Associate Professor Hill*

CE 205. *Applied Elasticity.* Introduction to linear theory of elasticity; solutions of two-dimensional problems; three-dimensional problems of torsion and bending; stress concentrations; energy and variational principles with applications to design. 3 units. *Professor Meriam and Assistant Professor Hill*

CE 211. *Mechanical Behavior of Materials.* Macroscopic mechanical properties of materials for static, fatigue, dynamic and creep conditions; impact, shock, and stress wave properties; temperature, creep, viscoelastic and relaxation properties. 3 units. *Visiting Associate Professor Kumar*

CE 212. Structural Materials. Elasticity and plasticity as related to rheology; natural and synthetic materials; reinforced materials; composites. 3 units. *Visiting Associate Professor Kumar*

CE 221. Incompressible Fluid Flow. Steady and unsteady pipe flow, theories of turbulent flow; water hammer theory and control; surge tanks; air chambers; the analysis and control of fluid systems; effect of resistance; tapered conductors. 3 units. *Assistant Professors Harrawood and Wood*

CE 231. Structural Engineering. The application of the fundamental theories of structural action to the design and analysis of structural members; specifications. 3 units. *Professor Brown*

CE 232. Reinforced Concrete Design. Design and analysis of reinforced concrete members including the influence of shrinkage and plastic flow; bond and diagonal tension; prestressed concrete members. 3 units. *Professor Brown*

CE 235. Foundation Engineering. An introduction to methods of analysis, design and construction of foundations. Bearing capacity and settlement of shallow and deep foundations. Soil exploration; excavation and bracing; drainage and stabilization; underpinning. Foundation vibrations. 3 units. *Professor Vesic*

CE 243, 244. Sanitary Engineering Unit Operations and Process Design. Fundamental bases for design of water and waste treatment systems, including transport, mixing, sedimentation and filtration, gas transfer, coagulation, and bio-treatment processes. 6 units. *Professor Bryan*

CE 250. Engineering Analysis. General concepts of the solutions of engineering problems with special emphasis on digital and analog computer and numerical methods; deflection and stability; torsion of non-circular beams and multicelled thin-walled structures; vibrations of beams and membranes; structures with both uniform and nonuniform properties and with rigid and nonrigid supports. 3 units. *Assistant Professor Wood*

CE 302. Theory of Plates and Shells. Analysis of stresses and deformation of plates; vibrations of plates; membrane stress systems in shells; cylindrical shell analysis; bending stresses in shells. Prerequisite: CE 201, or CE 205, or equivalent. 3 units. *Associate Professor Hill*

CE 321. Mechanics of Ideal Fluids. Basic equations of ideal fluid flow; potential and stream functions; vortex dynamics; body forces due to flow fluids; methods of singularities in two-dimensional flows; analytical determination of potential functions; conformal transformations; free-streamline flows. Prerequisite: Mathematics 285, 286 or equivalent. 3 units. *Assistant Professors Harrawood and Wood*

CE 322. Mechanics of Viscous Fluids. Equations of motion of a viscous fluid; general properties and selected solutions of the Navier-Stokes equations; boundary layer equations with selected approximate solutions; laminar boundary layers. Prerequisite: Mathematics 285, 286. 3 units. *Assistant Professors Harrawood and Wood*

CE 331, 332. Advanced Structural Design and Analysis. Analytical and

behavior concepts of structural components as related to the design of structural systems; classical methods; numerical and approximate techniques; behavior of structural elements under static and dynamic loading; buckling behavior. Prerequisite: CE 231 or equivalent. 6 units. Assistant Professor Barton

CE 335. *Mechanical Behavior of Soils.* Origin of soils, soil minerals and processes of soil formation; physical chemistry of multiphase systems and soil structure. Elements of soil stabilization; permeability and flow of water through soils: capillary and osmotic phenomena; seepage problems; soil compressibility; theory of consolidation; shear strength and failure criteria. Stress-strain relationships, volume changes and pore pressures during shear, strength properties. Advanced laboratory soil testing techniques. 4 units. Professor Vesic

CE 336. *Advanced Soil Mechanics.* Theories of plastic and elastic equilibrium of soil masses and their application to analysis of problems such as: pressure on retaining walls, anchored bulkheads, cofferdams, silos, shafts, tunnels; stability of slopes and earth dams; stresses and settlement in soil masses and pavements, piles and pile groups subjected to lateral loads, elements of soil dynamics. Prerequisite: CE 335. 4 units. Professor Vesic

CE 365. *Advanced Topics in Civil Engineering.* Opportunity for study of advanced subjects relating to programs within the Civil Engineering Department tailored to fit the requirements of a small group. 1 to 3 units. Members of the Graduate Staff

Electrical Engineering

Professor Wilson, *Chairman* (128 Engineering); Professor Owen, *Director of Graduate Studies* (108A Engineering); Professors Artley, Meier, and Vail; Associate Professors Burger (Adjunct), Kerr, and Wells; Assistant Professors George, Hacker, and Pilkington; Lecturers Hampikian (Visiting) and Trickey

A student may specialize in any one of the following fields in working toward either the M.S. or the Ph.D. degree with a major in Electrical Engineering: solid-state materials and devices; ferromagnetics; superconducting circuits; instrumentation; electronics; microwaves; computers and automatic control; energy conversion; information processing; and biomedical engineering.

A minimum prerequisite to the graduate courses in electrical engineering is a basic knowledge of differential equations, electric and magnetic field theory, and the theory of networks. A previous course in modern physics is recommended.

EE 201. *Energy Systems.* Application of general energy concepts to specific engineering devices and systems; use of mathematical models to describe concepts of energy storage, transfer, transformation, and control

that are applicable to electromagnetic, mechanical, fluid, and thermal systems; the Lagrangian, Hamiltonian formulation, tensors. Prerequisite: permission of instructor. 3 units. *Associate Professor Artley*

EE 203, 204. Information Systems. General concepts of information storage, transfer, and processing; information theory, coding, noise theory, and response of information-handling systems in the time and frequency domains. Applications of information concepts to specific engineering situations: modulation, sampling, optimum filtering, detection in presence of noise, and comparisons of various systems. Prerequisite: permission of instructor. 6 units. *Professor Owen, Associate Professor Kerr, and Assistant Professor George*

EE 207. Network Synthesis. Linear network theory, including a review of time and frequency domain analysis; network graphs; network functions and realizability conditions; driving point impedance synthesis of passive networks; driving point and transfer specifications; approximation methods. Prerequisite: permission of instructor. 3 units. *Professors Owen and Vail*

EE 211. Solid-State Theory. The fundamental theory of wave motion in solids, including wave mechanics; variational method; perturbation theory; many-electron problems; one-electron approximation; free-electron approximation; electron spin; Brillouin zones; time-dependent Schrodinger's equation; and transition probabilities. Introduction to the thermodynamics of solids, including Maxwell-Boltzmann, Bose-Einstein, and Fermi-Dirac statistics; ensembles; entropy; and free-energy functions. Prerequisite: permission of instructor. 3 units. *Professors Artley and Vail, Adjunct Associate Professor Burger, Assistant Professors Hacker and Pilkington*

EE 212. Solid-State Materials. Concepts of solid state physics as applied to engineering materials: electrical, magnetic, thermal, and mechanical properties of solids; dielectrics; ferroelectrics; semiconductors; magnetic materials; and superconductors. Prerequisite: EE 211. 3 units. *Professors Artley and Vail, Adjunct Associate Professor Burger, Assistant Professors Hacker and Pilkington*

EE 222. Nonlinear Analysis. Introduction to methods of analyzing engineering systems described by nonlinear differential equations; analytic, numerical, graphical, and series approximation methods; analysis of singular points; stability of nonlinear systems. Application of various methods, such as the modified Euler, Runge-Kutta, isoclines, perturbation, revision, variation of parameters, residuals, harmonic balance, Bendixon, and Liapounov to phenomena of nonlinear resonance, subharmonics, relaxation oscillations, and forced oscillating systems. Prerequisite: permission of instructor. 3 units. *Professor Wilson*

EE 231. Nuclear Engineering. Review of nuclear physics; fission and the chain reaction; nuclear reactor principles; materials, instrumentation, and control of nuclear reactors; selected applications and techniques of

nuclear engineering. Prerequisite: permission of instructor. 3 units.*
Professor Meier

EE 241. *Feedback Control Systems.* Analysis and design of linear sampled-data systems; linear systems subjected to random inputs; analytical design using mean square error and integral error criteria; nonstationary and nonlinear systems. Prerequisite: permission of instructor. 3 units.
Professor Wilson and Associate Professor Wells

EE 259. *Advanced Electric Energy Conversion.* Equations of motion of electromechanical systems; fields and lumped parameters; state function concepts; mathematical techniques for analyzing electromechanical devices and systems; transducers; unified treatment employing matrix, tensor, and blockdiagram concepts to obtain response under static and dynamic conditions; the generalized rotating machine. Prerequisite: permission of instructors. 3 units.* *Professors Meier and Wilson and Lecturer Trickey*

EE 265. *Advanced Topics in Electrical Engineering.* Opportunity for study of advanced subjects related to programs within the electrical engineering department tailored to fit the requirements of a small group. Prerequisite: approval of the Director of Graduate Studies and of instructor under whom work will be done. 1 to 3 units.* *Members of the Graduate Staff*

EE 311. *Quantum Theory in the Engineering of Materials.* Concepts of the quantum theory of solids as applied to the molecular design of engineering materials. Topics selected will vary somewhat with the interests of the class, but the importance of quantized fields in crystals (phonons, magnons, plasmons, excitons, and polarons) and the interaction of these fields will be stressed. Prerequisites: EE 212 and Physics 316. 3 units.
Assistant Professor Pilkington

EE 313. *Magnetics.* A study of ferromagnetic and ferrimagnetic materials, including effects of thermal conditions and treatment, mechanical stress, magnetic field intensity, crystal structure, and macroscopic geometry. Study emphasizes relationships of fundamental concepts of engineering interest. Prerequisite: EE 211 or equivalent. 3 units.*
Professors Artley and Wilson and Assistant Professor Hacker

EE 315, 316. *Solid-State Devices.* Study of terminal parameters and functional characteristics of electronic devices in terms of the properties and structural configurations of their constituent materials. First semester emphasis on such semi-conductor devices as transistors and on integrated semiconductor circuits; second semester emphasis on other types of solid-state devices. Prerequisite: permission of instructor. 6 units.* *Adjunct Associate Professor Burger, Assistant Professor Pilkington, and Visiting Lecturer Hampikian*

EE 321. *Nonlinear Electromagnetics.* Mathematical description of nonlinear magnetic and semiconductor characteristics; transient and steady-state analysis and synthesis of nonlinear systems with application to such

topics as magnetic amplifiers, frequency converters, oscillators, computer logic, and switching devices. Prerequisite: permission of instructor. 3 units. *Professor Wilson*

EE 342. Optimum Control Systems. Use of variational methods in control system design; classical calculus of variations; dynamic programming; Pontriagin's maximum principle; computer applications in control. Prerequisite: permission of instructor. 3 units. *Associate Professor Kerr*

EE 343. Nonlinear Control Systems. Analysis and design of nonlinear feedback control systems; approximations for small and large disturbances; phaseplane analysis; describing-function techniques; relay servomechanisms, optimum and quasi-optimum performance; nonlinear compensation. Prerequisite: permission of instructor. 3 units. *Professor Wilson and Associate Professors Kerr and Wells*

Mechanical Engineering

Professor Kenyon, *Acting Chairman and Director of Graduate Studies* (142A Engineering); Professors Linderoth, Macduff, and Meriam; Associate Professors Boyle, Elsevier, Harman, and Pearsall; Assistant Professor Buzzard

Specialization in the following areas of study is available to students seeking the M.S. degree with a major in Mechanical Engineering: materials science; compressible and incompressible fluids; engineering mechanics; vibrations; heat transfer; and instrumentation. Emphasis is placed on the application of the fundamental concepts of basic science and engineering science to mechanical design and analysis.

A minimum prerequisite to the graduate courses in mechanical engineering is a basic knowledge of differential equations, undergraduate thermodynamic theory, mechanics, and machine design.

ME 201. Theoretical and Applied Mechanics. Introduction to the theory of elasticity, vibration analysis, and hydrodynamics. 3 units. *Professors Macduff and Meriam*

ME 202. Theoretical Thermodynamics. Classical and modern concepts of the conversion of heat and work; the combined First and Second Law; thermo-electricity; super-critical pressure systems; reheat and regenerative processes; binary-vapor systems; introduction to unsteady systems. 3 units. *Associate Professors Elsevier and Harman*

ME 221. *Analysis of Compressible Fluid Flow. Flow of compressible fluids; concepts of subsonic, sonic, and supersonic flow; experimental methods. 3 units. *Associate Professor Harman*

ME 222. Analysis of Heat Transfer. Heat transfer by conduction, convection, and radiation; lumped and distributed heat capacity, resistance, losses; steady and transient flow. 3 units.* *Professor Kenyon*

ME 231-232. Systems Engineering. Methods of obtaining parameters for strength, response, and stability studies of mechanical systems; imped-

ance and operational means of analysis; mechanical and electronic analogs; nonlinear theories. 6 units. *Professor Macduff*

ME 265. *Advanced Topics in Mechanical Engineering.* Opportunity for study of advanced subjects related to programs within mechanical engineering tailored to fit the requirements of a small group. Prerequisites: Approval of the Director of Graduate Studies and the instructor under whom work will be done. 1 to 3 units. *Members of the Graduate Staff*

ME 280. *Nuclear Reactor Power Cycles.* Introduction to basic reactor principles and reactor types; consideration of thermodynamic cycles for nuclear reactors for stationary and mobile plants; analysis of fluid flow and heat transfer problems unique to reactors with development of methods of reactor safety techniques; metallurgical problems peculiar to reactor design. 3 units.* *Professor Kenyon*

English

Professor Stevenson, *Chairman* (323 Allen Building); Professor Nygard, *Director of Graduate Studies* (321 Allen Building); Professors Boyce, Duffey, Gohdes, Lievsay, Patton, Sanders, Turner, and Ward; Associate Professors Budd, Ferguson, Heninger, Smith, and Williams; Assistant Professor Randall

The department offers graduate work leading to the A.M., M.A.T., and Ph.D. degrees. A statement of the requirements for the Ph.D. degree may be obtained from the Director of Graduate Studies.

For Seniors and Graduates

203. *Chaucer.* Reading and interpretation of the minor poems, *Troilus*, and *The Canterbury Tales*. 3 units. *Professor Nygard*

207. *Old English Grammar and Readings.* 3 units. *Professor Nygard*

208. *History of the English Language.* A survey of the language from Old to Present-day English, taking into consideration developments in phonology, morphology, syntax, and vocabulary. 3 units. *Professor Nygard*

209. *Present-Day English.* A description of present-day American English from the point of view of modern linguistic theory; comparison of traditional and structural grammars; semantic change; the relation of the written to the spoken language; usage. 3 units. *Professor Nygard*

213. *Introduction to Folklore.* A survey of the materials of popular tradition, the folksong, the folktale, the proverb, the riddle, and other forms; the methods of folklore investigation; and the relation of these popular genres to literary tradition. 3 units. (Not 1966-67) *Professor Nygard*

215, 216. Elizabethan Drama. 6 units. *Professor Lievsay, Assistant Professor Randall*

217. Milton. Milton's poetry and prose, with emphasis on the major poems. 3 units. (Not 1966-67) *Professor Lievsay*

218. Spenser. A study of his works. 3 units. *Associate Professor Heninger*

219, 220. The Eighteenth Century. Swift, Pope, Defoe, Addison, Steele, and others are studied in the first semester; in the second, Gray, Johnson, Boswell, Collins, Goldsmith, the novelists, and other writers. 6 units. *Professor Boyce, Associate Professor Ferguson*

221, 222. English Literature of the Early Nineteenth Century. Wordsworth, Coleridge, Scott, Byron, Shelley, Keats, Lamb, Hazlitt, and other writers. 6 units. *Professors Patton, Sanders, and Stevenson*

223, 224. English Literature of the Later Nineteenth Century. The first semester is devoted chiefly to Carlyle, Dickens, Thackeray, Tennyson and Browning; the second semester to Arnold, Ruskin, Pater, George Eliot, Meredith, the Pre-Raphaelites, and Swinburne. 6 units. *Professors Sanders, Stevenson*

227. Literary Criticism. A study of the Greek and Roman critics, in chronological order but with emphasis on their permanent value rather than on the mere history; also of the Continental and English critics to about 1700. 3 units. (Not 1966-67) *Professor Lievsay*

229, 230. American Literature, 1800-1865. The writers emphasized in the first semester are Emerson, Thoreau, and Hawthorne; in the second semester, Poe and Melville. 6 units. *Professor Turner, Associate Professor Budd*

233, 234. American Literature, 1865-1920. Selected works of representative authors of the period. The first semester will include Whitman, Lanier, Mark Twain, James, Howells, Emily Dickinson, Henry Adams, and the Local Colorists; the second semester, Crane, Norris, Moody, London, Dreiser, Edith Wharton, Willa Cather, O'Neill, Robinson, and Frost. The lectures will deal primarily with literary trends as shaped by the social background. 6 units. *Professor Gohdes*

235, 236. American Literature Since 1920. First semester, selected fiction from Gertrude Stein to the present. Second semester, poetry from the Imagist movement to the present. 6 units. *Professor Duffey*

237. English Drama, 1642-1800. The heroic play and the comedy of manners of the Restoration; the important plays, serious and comic, of the eighteenth century. 3 units. *Professor Ward*

239. Shakespeare. The plays and poems. 3 units. *Associate Professors Heninger and Williams*

244. Literary Biography. Reading and discussion of works by Plutarch, Roper, Walton, Aubrey, Mason, Johnson, Boswell, Lockhart, Carlyle, Froude, Gosse, and Strachey: the development of the literary form, its

various methods, various theories of its nature and purpose. 3 units. *Professor Sanders*

251, 252. *English Literature of the Seventeenth Century.* Major works in prose, poetry, and drama from 1600 to the death of Dryden. 6 units. *Professor Ward*

261, 262. *English Literature of the Twentieth Century.* Representative work of leading writers from 1900 to 1950, in fiction, drama, and poetry. The first semester will include Shaw, Conrad, Yeats, Wells, Bennett, Galsworthy, Ford, Synge, Forster, and Lawrence; the second semester, Joyce, Woolf, Edith Sitwell, Eliot, Huxley, Graves, Bowen, Auden, and Dylan Thomas. Critical analysis of selected texts, with discussion of techniques and ideas. 6 units. *Associate Professor Smith*

264. *Major Developments in Contemporary American Poetry.* The principal contributions to modern poetry made by American poets, including imagism and the new poetry; Eliot, Stevens, Crane, the "Fugitives," and a selection from the poets of the present generation. 3 units.

266. *Recent Critical Thought.* Questions of the nature and value of literature as reflected in recent criticism, theoretical and practical. 3 units. *Professor Duffey*

269, 270. *Southern Literature.* The principal authors and the chief literary development from the beginning to the present. Emphasis in the first semester is on Byrd, Kennedy, Simms, Poe, Timrod, and the humorists; in the second on Lanier, Harris, Cable, Mark Twain, Ellen Glasgow, and Faulkner. Attention is given to the historical and cultural background and to literary relations extending outside the region. 6 units. *Professor Turner*

277. *English Prose of the Sixteenth Century.* Readings in the major forms and authors. 3 units. *Professor Lievsay*

278. *English Non-Dramatic Poetry of the Sixteenth Century.* Extensive select readings from representative types and authors, excluding Spenser. 3 units. *Professor Lievsay, Associate Professor Heninger*

For Graduates

304. *Studies in the Metaphysical Poets.* A careful study of Donne, Herbert, and Vaughan against the seventeenth-century background, with some attention to their influence on other writers in the period and their impact on twentieth-century poetry. 3 units. *Professor Lievsay*

306. *Studies in Chaucer.* Cultural background, sources, themes, structures; special attention to *Troilus* and the dream-vision poems. 3 units. *Professor Nygard*

311. *Beowulf.* Reading and interpretation of the text. 3 units. *Professor Nygard*

313. *The Traditional Ballad and Folksong.* Studies in English, Scottish, and American popular poetry, with attention to the textual and musical

traditions. (No technical knowledge of music is required.) 3 units. (Not 1966-67) *Professor Nygard*

315. *Middle English Literature.* The literature of England from 1100 to 1500 (excluding Chaucer); a study of medieval genres with a close reading of selected major works. 3 units. *Professor Nygard*

320. *Medieval Romances.* Origins, types, forms, themes; special attention to Arthurian materials. 3 units. (Not 1966-67)

322. *Genre Studies in Twentieth-Century American Literature.* Formal and thematic problems posed by the fiction, poetry or drama of this century. 3 units. *Professors Duffey and Gohdes*

330. *Textual Criticism.* The principles of analytical bibliography and their application to problems and procedures in the study of Elizabethan printed books. 3 units. *Associate Professor Williams*

331. *Emerson.* A study of Emerson's ideas as reflected in selected examples of his essays and poems. 3 units. (Not 1966-67) *Professor Gohdes*

332. *Whitman.* A detailed study of *Leaves of Grass* and of selected prose works. 3 units. (Not 1966-67) *Professor Gohdes*

333. *Hawthorne and Melville.* Extensive reading in the works of Hawthorne and Melville, and close study of selected writings. 3 units. *Professor Turner*

334. *Studies in the Critical and Philosophical Ideas of Coleridge and Carlyle.* 3 units. *Professor Sanders*

338. *Studies in American Realistic Fiction.* Intensive study of a post-Civil War novelist such as Howells, with lesser attention to a representative precursor such as De Forest, and a twentieth century writer such as Dreiser. 3 units. *Associate Professor Budd*

339. *Studies in Shakespeare.* Intensive study of carefully limited topics, together with critical analysis and interpretation of selected texts. 3 units. (Not 1966-67) *Associate Professor Heninger*

340. *Studies in Renaissance English Prose.* Close readings in various forms and authors as they reflect the culture and thought of the Renaissance. 3 units. *Professor Lievsay*

342. *Studies in Dryden and His Age.* The early poems, the important odes, the religious and political poems, selected critical and controversial prose, the heroic play and tragedy. 3 units. (Not 1966-67) *Professor Ward*

345. *The Eighteenth-Century Novel.* Richardson, Fielding, Smollett, and Sterne are emphasized. Attention is given to earlier prose fiction and to other contributing literary patterns. 3 units. *Professor Boyce*

346. *Studies in Swift.* Intensive study of the major prose; selected readings in the verse, political writings, and miscellaneous prose. 3 units. *Associate Professor Ferguson*

347. *Studies in Victorian Poetry.* Analysis of themes, forms, and sources

in the works of Tennyson, Browning, Arnold, Rossetti, Swinburne, Meredith, Hardy, and Hopkins. 3 units. *Professor Stevenson*

348. *Studies in Victorian Fiction.* Techniques and principal types of material in the novels of Dickens, Thackeray, Trollope, Eliot, Meredith, and Hardy. 3 units. *Professor Stevenson*

363. *Studies in British Poetry of the Twentieth Century.* Detailed examination of major poetic texts, with background readings in prose. 3 units. *Associate Professor Smith*

374. *Studies in American Humor.* The native tradition in the Down-East humorists and the humorists of the Old Southwest, in Mark Twain and his contemporaries, and afterward. 3 units. *Professor Turner*

378. *Samuel Johnson's Literary Criticism and Related Topics.* 3 units. *Professor Boyce*

English for Foreign Students. A non-credit semester course in English for foreign students. Restricted to registered undergraduate and graduate foreign students and, to capacity, to employees and wives of foreign students. Without fee for registered students who are permitted an audit without fee; otherwise a \$5.00 fee.

Forestry

Professor Harrar, *Chairman* (213 Biological Sciences Building); Professor Yoho, *Director of Graduate Studies* (104 Biological Sciences Building); Professors Anderson, Barnes, Kramer, Naylor, Osborne, and Ralston; Associate Professors Johnson, Stambaugh, and Woods; Assistant Professors Braaten, Knoerr, and Sullivan

Major and minor work is offered in the natural and social scientific aspects of forestry leading to the Master of Arts and Doctor of Philosophy degrees. Work for these degrees may be pursued in forest-tree physiology, wood anatomy and properties, forest pathology, silvics, forest soils, forest mensuration and biometry, forest entomology, forest economics, and forest climatology and hydrology. College graduates who have had specialized training in professional forestry or the related basic areas of the natural or social sciences may be considered for admission. Students without previous forestry training are ordinarily restricted to the particular fields (listed above) for which their academic background qualifies them. For information on professional training in forestry see Bulletin of the School of Forestry.

For Seniors and Graduates

223. *Forest Pathology.* Infectious and non-infectious diseases of forest trees, and related deterioration of forest products. Field and laboratory

study of symptoms, etiology, and control. Prerequisites: Botany 1 and 2, or equivalent. 3 units. *Associate Professor Stambaugh*

230. Forest Entomology. Principles of protecting forests from injurious insect infestations; characteristics and identification of insect-caused damage to trees and wood products; identification, biology, and control of the more important tree-infesting insect species. 3 units. *Professor Anderson*

243. Silvics. Ecological foundations of silviculture with special reference to forest site factors; influence of forests on their environment; growth and development of trees and stands; origin, development, and classification of forest communities; methods of studying forest environments. Desirable prerequisite: plant physiology, plant ecology, and Forestry 261, or equivalent. 3 units. (Summer only.) *Associate Professor Woods*

251. Sampling Methods in Forestry. Statistical background for solution of sampling problems with special references to sampling of forest and associated populations. Prerequisite: Forestry 151. 3 units.* *Professor Osborne*

257. Design of Forestry Experiments and Analysis of Data. Role of experimental design in field and laboratory, and statistical analysis of data as aspects of scientific method in forest research. 3 units.* *Assistant Professor Braaten*

261. Forest Soils. Origin, development, and classification of soils with special emphasis on those developed in humid climates; morphological, physical, and chemical properties of soils in relation to growth of trees; effect of forests on soils. Prerequisites: Chemistry 1 and 2, and Physics 1, or equivalents; physical geology, mineralogy, petrology, and analytical chemistry are also desirable. 3 units. *Professor Ralston*

270. Economics of Forestry. Development of the principles of economics useful in the analysis of the past, present, and prospective supply and demand situations for forestry goods and services; problems of the economics of the firm and industry, basic and peculiar to forestry, with special attention to the time dimensions of value; the role of forestry in the general economy including attention to relevant institutional factors. Prerequisite: at least one course in the principles of economics. 3 units. *Professor Yoho*

276. Forestry Policy. Objective study and analysis of the development of public land and forestry policies in the United States, present policies of public and private forestry organizations, and current policy issues in the light of economic and other criteria. 2 units. *Professor Yoho*

290. Wood Anatomy. Study of the physical features and the gross and minute structural characteristics of wood leading to the identification of the commercial woods of the United States, and the important tropical woods used in American wood-working industries. Elementary micro-

technique. Prerequisites: one year of biology, Forestry 241 or equivalent. 3 units. *Assistant Professor Sullivan*

295. Surface Generation in Wood. Directed energy systems; physics of edges; details of wood surface generation machinery; surface generation in relation to wood anatomy; physical measurement of wood surfaces. Prerequisites: For. 290 or equivalent, calculus. 2 units. *Assistant Professor Sullivan*

296. Chemistry of Wood. Nuclear, atomic and molecular force systems; chemical composition and distribution of chemical components in wood; interaction of wood and moisture; macro-chemical reactions of wood and other cellulosic systems including degradation reactions. Prerequisites: Forestry 290 or equivalent, calculus, organic chemistry. 3 units. *Assistant Professor Sullivan*

297. Wood Physics (Mechanics). A study of the reaction of wood to mechanical forces; the derivation of working properties and their variance; experimental and standard testing procedures; introduction to theories of elasticity and plasticity; theories of failure; anatomical and moisture effects. Prerequisites: Forestry 290 or equivalent, calculus, college physics, statistics. 3 units. *Assistant Professor Sullivan*

For Graduates

301, 302. Advanced Studies in Forestry. To meet individual needs of graduate students in the following branches of forestry: (a) Silvics, (b) Forest Soils, (c) Forest Economics, (f) Properties of Wood, (g) Forest Mensuration and Biometry, (h) Forest Entomology, (k) Forest-tree Physiology, (l) Forest Pathology, (m) Forest Climatology and Hydrology. *As designated under 357, 358*

321. Research Techniques in Forest Pathology. Fundamental phytopathological methods employed in field and laboratory investigations of tree disease pathogens. Literature review and discussion of current developments. Prerequisite: Forestry 223 or equivalent. 3 units. *Associate Professor Stambaugh*

331. Toxicology of Insecticides. Study of the physical, chemical, and biological properties of materials used to destroy insects. Formulation, toxicology and insect physiology as related to insecticide action are emphasized. Prerequisites: one course in entomology; organic chemistry is recommended. 3 units. *Professor Anderson*

332. Ecology of Forest Insects. Study of the environmental factors as they influence insect population development. Both the physical and the biotic aspects are considered on the basis of field and laboratory experimental methods. Prerequisite: Forestry 230 or equivalent. 3 units. *Professor Anderson*

333. Morphology and Taxonomy of Forest Insects. Principles of insect structure, classification and nomenclature; laboratory work concentrated on the collection, preservation and identification of both the adult and im-

mature stages of various forest insects. Prerequisite: Forestry 230 or equivalent. 3 units. *Professor Anderson*

341. Forest Meteorology. The science of meteorology, including microclimatology, as it is related to forest biology and hydrology; emphasis is on physical laws governing exchange of heat and moisture in the climatic environment. Prerequisite: One year of college physics; calculus desirable. 3 units. *Assistant Professor Knoerr*

342. Forest Hydrology. The influence of forests and other vegetation on local climate, the hydrolic cycle, and soil stability; relationships to water yield, floods, and erosion. Prerequisite: One year of college physics; calculus desirable. 3 units. *Assistant Professor Knoerr*

344. Micrometeorology. Physics of the earth's surface environment with emphasis on plant and animal microclimates: budgets of mass, momentum and energy; vertical structure of wind, temperature, water vapor and carbon-dioxide in relation to exchange processes within the biosphere; local circulation and eddy diffusion; principles of micrometeorological measurement. Prerequisite: Forestry 341, calculus desirable. 3 units. *Assistant Professor Knoerr*

347, 348. Seminar in Silvics. Advanced topics in silvics are discussed and current research papers and reports are reviewed, analyzed, and evaluated. 2 units. *Associate Professor Woods*

352. Analysis of Forest Measurements. Empirical equations and curve-fitting appropriate to forestry data; functional relationships among experimental responses; useful mathematical models for forestry populations; selected non-parametric analysis methods. Prerequisite: Forestry 250 or Mathematics 233 or equivalent. 3 units. *Assistant Professor Braaten*

353. Sampling and Experimental Design in Forestry. Theory and application of selected sampling designs to forestry populations. Includes multistage and multi-phase designs; acceptance and sequential sampling; regression, ratio, and double sampling; sampling with variable probability of selection. Construction and analysis of designs for forestry experiments. Prerequisites: Forestry 250 or mathematics 233 or equivalents. 3 units. *Professor Osborne*

357, 358. Research in Forestry. Credits to be arranged. Students who have had adequate training may do research under direction of members of the faculty in the following branches of forestry.

Silvics. Prerequisites: Forestry 241, 243, and 244, or equivalents. *Associate Professor Woods*

Forest Soils. Prerequisite: Forestry 261 or equivalent. *Professor Ralston*

Forest Economics. Prerequisite: Forestry 270 or equivalent. *Professor Yoho*

Properties of Wood. Prerequisites: Forestry 259 and 260, or equivalents. *Professor Harrar and Assistant Professor Sullivan*

Forest Mensuration and Biometry. Prerequisites: Forestry 151, 251,

and 252, or equivalents. *Professor Osborne and Assistant Professor Braaten*

Forest Entomology. Prerequisite: Forestry 230 or equivalent. *Professor Anderson*

Physiology of Forest Trees. Prerequisites: Plant physiology and plant ecology or silvics. *Professor Kramer*

Forest Pathology. Prerequisites: Plant physiology and Forestry 223 or equivalent. *Assistant Professor Stambaugh*

Forest Climatology and Hydrology. Prerequisite: Forestry 341, 342, or equivalents. *Assistant Professor Knoerr*

362. Forest Soil Physics. Analysis of the physical properties of soil related to the growth and development of forest trees. Consideration is given to the significance of soil moisture, temperature, aeration, and structural characteristics in the analysis of forest growth relationships. Prerequisite: Forestry 261. 3 units. (Not 1966-67) *Professor Ralston*

366. Forest Soil Fertility. The relationships of soil fertility factors in the growth of forest trees. Emphasis is placed on the analysis of soil factors related to the mineral nutrition of trees. Prerequisites: Forestry 262 with analytical chemistry recommended. 3 units. (1966-67) *Professor Ralston*

368. Field Seminars. Field studies, consultations, and visits to areas of interest during spring vacation period, or at other times, in the several branches of forestry listed under Forestry 301-302. Credits to be arranged. As designated under 357, 358

378. Seminar in Forest Economics. Examination and discussion of the application of economic concepts in forestry, the potential contribution of economic analysis to private and public forest management; current research in forest economics. Prerequisites: Forestry 270 and 379 or consent of the instructor; advanced courses in economics and economic theory are desirable. 2 units. *Professor Yoho*

379. Economic Analysis in Forestry. Principles of economics of particular value to problems of resource allocation and efficiency in private forest management based on a static and dynamic firm theory approach, linear programming and activity analysis. Development of production principles applicable to forestry problems in use of land, labor, and capital; resource and production combinations; production location and timing; cost structure and asset control; uncertainty and expectations. Prerequisites: Forestry 270 or consent of instructor. 3 units. *Professor Yoho*

390. Wood-Liquid Surface Interactions. Free surface energy of liquids and solids; theory of adhesion; adhesion for wood substrates; physical and chemical description of adhesives and adhesive joints; wood coatings; physical and chemical properties of surface coating materials. Prerequisites: Forestry 296. 3 units. *Assistant Professor Sullivan*

391. Seminar in Wood Science and Forest Products. Application of

scientific disciplines to product research and development; wood science in industry. 1 unit. *Professor Harrar, Assistant Professor Sullivan*

392. *Advanced Wood Physics.* Theories of elasticity and plasticity; mechanical damping; piezoelectric properties; structure of crystals; fatigue failure. Prerequisites: Forestry 297, Forestry 296, Experimental Design. 3 units. *Assistant Professor Sullivan*

Geology

Professor Berry, *Chairman* (019 Science Building); Associate Professor Heron, *Director of Graduate Studies* (105 Science Building); Assistant Professors Pilkey, Lynts

The Department of Geology offers graduate work leading to the A.M. degree. An undergraduate degree in geology is not a prerequisite for graduate studies, but a student must have had or must take introductory courses in field geology, mineralogy, sedimentary rocks, stratigraphy, paleontology, and structural geology. In addition he must have had one year of college chemistry, one year of college physics, and mathematics through calculus.

Graduate courses in the Department of Geology are designed to provide training in the field of environmental sedimentary geology with specialized training in bio-environments, litho-environments, or modern environments.

An acceptable thesis is required.

For Seniors and Graduates

203. *Advanced Stratigraphy.* A survey of the Phanerozoic deposits of the world with special emphasis on type areas. 3 units.

206. *Geological Oceanography.* A broad survey of many geological aspects of the oceans including sediment types, processes of sedimentation, geological structures of the ocean basins, and bottom physiography. 3 units. *Assistant Professor Pilkey*

207. *Sedimentary Petrography.* Systematic description and classification of sedimentary rocks. 3 units. *Associate Professor Heron*

222. *Sedimentary Minerals.* Major detrital and authigenic minerals with emphasis on the clay minerals. 3 units. *Associate Professor Heron*

235. *Sedimentary Geochemistry.* A survey course of the broader aspects of marine geochemistry and the geochemistry of ancient and recent sediments. Also included is a review and general summary of inorganic chemical principles important in the control of geochemical processes. 3 units. *Assistant Professor Pilkey*

For Graduates

305. *Physical Environments Seminar.* 3 units. Assistant Professor Pilkey

306. *Bio-Environments Seminar.* 3 units.

371, 372. *Advanced Topics in Geology.* To meet the individual needs of graduate students for independent study in the various environmental sedimentary fields. 1 to 3 units. All Members of the Graduate Staff

Related Courses in Other Departments

Courses comprising a candidate's minor may be selected from the fields of zoology, physics, mathematics, chemistry, or approved courses offered in the Department of Geology at the University of North Carolina at Chapel Hill.

Germanic Languages and Literature

Professor Salinger, *Chairman and Director of Graduate Studies* (106 Foreign Languages); Visiting Professor Kunstmann; Associate Professors Phelps, Seymour; Visiting Associate Professor Bruhn

The Department of Germanic Languages and Literature offers graduate work leading to the A.M. degree. Students who expect to major in German should have had sufficient undergraduate courses in Germanic languages to enable them to proceed to more advanced work.

Students who wish to take courses in German for a minor should normally have completed a third-year course (in exceptional cases, a second-year) of college German with acceptable grades.

For Seniors and Graduates

201, 202. *Goethe.* A study of his life and works, in the light of his lasting significance to world literature. 6 units. (1966-67) Professor Salinger

203, 204. *Eighteenth Century.* Eighteenth-century German literature in its relation to contemporary European philosophy. 6 units. (Not 1966-67) Associate Professor Phelps

205. *Middle High German.* The language and literature of Germany's first classical period. 3 units.* Associate Professor Seymour

206. *Middle High German.* The Arthurian Romance in Germany. 3 units.*

207, 208. *German Romanticism.* The course covers the entire field of German Romanticism from 1800 to 1850. 6 units.*

209, 210. *Kleist, Grillparzer, and Hebbel.* The development of the drama in Germany and Austria between Schiller and naturalism. 6 units.* Professor Salinger

211, 212. *Heinrich Heine.* A study of the German poet and his immediate successors in the movement known as *Jungdeutschland*. 6 units. (Not 1966-67) *Professor Salinger*

213. *Nineteenth-Century Literature.* From the end of Romanticism through Realism. Readings from Mörike, Büchner, Hebbel, Stifter, Keller, Meyer, Storm, and Fontane. 3 units.*

214. *The Twentieth Century.* From Naturalism to the present, with emphasis on Hauptmann, Hofmannstal, George, Rilke, Mann, Kafka, Hesse, Broch, Musil, Brecht and Benn. 3 units.*

215. *Seventeenth-Century Literature.* A study of the leading writers of the Baroque, seen against the background of their time. 3 units. (Not 1966-67) *Visiting Associate Professor Bruhn*

216. *History of the German Language.* The development of the phonology, morphology, and syntax of German from earliest beginnings to the present. 3 units. (1966-67) *Associate Professor Seymour*

217. *Sixteenth-Century Literature.* The period of the Reformation with particular emphasis on the personality and works of Martin Luther and his influence on German literature and culture. 3 units. *Visiting Professor Kunstmann*

218. *The Teaching of German.* Critical survey of modern teaching techniques; intensive practice in solving problems encountered in the teaching of German on the secondary and college levels. Analysis and evaluation of textbooks and related audio-visual materials with special emphasis on the utilization of the language laboratory. 3 units.* *Visiting Associate Professor Bruhn*

230. *German Cultural History.* A study of the backgrounds of German civilization and culture (*Kulturkunde*) in varying aspects and impacts from earliest times down to the most recent. 3 units.*

232. *Bibliography and Methods.* An introduction to the tools and methods of research in Germanic philology and German literature. 3 units.*

233. *Advanced Composition.* Intensive study of syntax; practice in the writing of German prose, aiming toward the development of an expressive and fluent style. 3 units.*

For Graduates

316. *The Austrian Novel from 1930 to the Present.* Studies in the developmental novel as practiced by Hermann Broch, Robert Musil and Heimito von Doderer within the framework of modern German literature. 3 units. *Professor Salinger*

— ***Graduate Reading Course.*** An intensive course in German to develop rapidly the ability to read German in several fields. Graduate students only. No credit.

Related Courses in Other Departments

The following courses in other departments are recommended to students who are majoring in Germanics, as particularly valuable in building a proper background for Germanic studies:

(a) Graduate courses in foreign or comparative literature or philology, offered by the ancient and modern language departments, to be selected after consultation with the Germanic Department.

(b) Graduate courses in history and philosophy, offered by those departments, to be selected after consultation with the Germanic Department.

History

Professor Watson, *Chairman* (235 Allen); Professor Parker, *Director of Graduate Studies* (232 Allen); Professors Alden, Colton, Crane, Curtiss, Durden, Ferguson, Hamilton, Holley, Lanning, Manchester, Preston, Ropp, and Woody; Associate Professors Acomb, Davis, Gillin, Hollyday, Lerner, A. Scott, W. Scott, Van Aken, and Young

A candidate for the degree of Doctor of Philosophy is required to prepare himself for examination in four fields, of which three shall normally be within history and of which one must be in American history or in the history of Western Europe. The choice and delimitation of fields is determined in consultation with his supervisor and the Director of Graduate Studies. The Department offers graduate instruction in Ancient History; Medieval Europe; Modern Europe; American History; England and the Commonwealth; Russia; Latin America; the Far East in the modern period; South Asia in the modern period; military history; and historiography.

Students may receive credit for either semester of a hyphenated course without taking the other semester if they obtain written permission from the instructor and the Director of Graduate Studies.

For Seniors and Graduates

201-202. *The History of Russia, 1801-1917.* The development of the Russian Empire in its political, social, and economic aspects, and the growth of forces leading to its downfall. 6 units. *Professor Curtiss*

203-204. *The United States, 1850-1900.* The rise of sectionalism, secession, wartime problems of the Union and Confederacy, political and economic adjustments of Reconstruction, the status of the Negro, the New South, problems of capital and labor, the agrarian revolt, political parties and reform. 6 units. *Professor Woody*

205-206. *The United States in the Twentieth Century.* The emergence

of the United States as a major power; attention is focused on domestic developments and conflicting theories of expansion and federal power. Emphasis in the first semester is on the progressive era and the first World War; the second semester is devoted to the twenties and to the Franklin Roosevelt administration. 6 units. *Professor Watson*

209-210. *Constitutional History of the United States, 1760 to the Present.* A study of the basic problems in forming the Constitution; of its development through the major crises in the history of the United States; of the effects of changing social, cultural, economic, and political conditions on the Constitution. 6 units. (Not 1966-67)

212. *Recent Interpretations of United States History.* A course designed to encourage a critical evaluation of major issues in United States history through examination of recent interpretations of key problems. 3 units. *Professor Watson*

213-214. *The Old South.* Political thought and party trends from Jefferson to Calhoun; agriculture, slavery, expansion; commerce, manufacturing, transportation; urban life, religion, education; the rise of Southern nationalism. 6 units. (Not 1966-67) *Professor Woody*

215-216. *The Diplomatic History of the United States.* A study of the history of American diplomacy, with particular emphasis upon those factors, foreign and domestic, which have shaped the foreign policies of the Republic. 6 units. *Associate Professor Davis*

217, 218. *Europe Since 1870.* International relations since the Franco-German War is the chief subject of study in this course; special emphasis is placed upon the underlying economic and political influences. 6 units.

221-222. *The Age of the Renaissance.* The decline of characteristic features of medieval civilization and the rise of modern European institutions with particular attention to intellectual movements from Dante to Erasmus. 6 units.

223-224. *The Old Regime and the French Revolution, 1661-1815.* A study of social, political, and intellectual revolutions in continental Europe, centering on France and giving special attention to successive interpretations of historical change. 6 units. *Associate Professor Acomb*

225. *The Age of the Reformation.* History and thought of Christianity between 1517 and 1680. (Also listed as Religion 250.) 3 units. *Associate Professor Hillerbrand*

227, 228. *Europe in the Nineteenth Century.* A study, beginning with the career of Napoleon Bonaparte, of the forces and personalities influential in the nineteenth century. Emphasis in the first semester is on the problems of the biographer; in the second, on those of a student of national communities. 6 units. *Professor Parker and Associate Professor Hollyday*

229. *Recent Interpretations of Modern European History.* A course designed to develop the ability to appraise critical historical issues through

the study and discussion of recent interpretations of key historical problems in modern European history. 3 units. *Professor Parker*

231-232. *The Hispanic Colonies and Republics in America.* 6 units. *Professor Lanning*

233-234. *The Institutional, Cultural, and Social History of Hispanic America.* The first semester deals with the culture, society, and institutions of the Spanish colonies in America, and the second semester with those of the Hispanic American Republics. 6 units. (Not 1966-67) *Professor Lanning*

235, 236. *European Expansion Overseas.* In the first semester attention is given to the age of discovery, and to the origin and the development of the great European overseas empires with special emphasis on the role of the Portuguese in India and the Americas. The work of the second semester deals with the decline of the mercantile empires, the emergence of independent centers of European culture overseas (Brazil being taken as an example), and the revival of mercantile imperialism in the late nineteenth and twentieth centuries. 6 units. *Professor Manchester*

237-238. *Europe in the Middle Ages, 359-1500.* Attention is given both to distinctive attributes of the period, such as feudalism and scholastic learning, and to such formative elements of European civilization as nationalism and the universities. 6 units. *Associate Professor Young*

241-242. *Nationalism and Communism in the Far East.* The growth of nationalism in China and Japan, culminating in Japan's invasion of China and the subsequent rise to power of the Chinese Communists. 6 units. *Associate Professor Gillin*

245-246. *War in the Modern World.* This course is concerned with the relations between warfare and modern political, economic and social conditions. Special attention is given to the development of British and American military methods and to the events of the American Civil War and the two World Wars. The work in the first semester deals with Clausewitz's theories of warfare and the period from the introduction of gunpowder to 1871; in the second semester there is a more detailed analysis of recent land, sea, and air warfare. 6 units. *Professor Ropp*

247. *The History of Modern India, 1757-1857.* Historiography of the period; the western impact on the sub-continent; the expansion of Company power; the background and nature of the Indian Mutiny; problems in historical analysis and interpretation. 3 units. *Professor Crane*

248. *The History of Modern India and Pakistan, 1857-1947.* Historiography of the period; Crown rule; social change; modernization and the economy of the sub-continent; development of nationalism; the Gandhian era and Muslim separatism; the transfer of power and partition; problems of independence. 3 units. *Professor Crane*

249-250. *Social and Intellectual History of the United States.* Evolution of American society and thought to the present; lectures and class discussions seek to illuminate the interplay of ideas and social practice by the

examination of attitudes and institutions in such fields as science and technology, law, learning, and religion. 6 units. *Professor Holley*

251-252. *Recent European History.* A history of the political and economic developments in Europe since 1870. 6 units. *Professor Colton*

257. *Social and Cultural History of the Hellenistic World from Alexander to Augustus.* Lectures, readings, and discussions. This course will not be separately credited without the sequel, 258. 3 units. *Professor Rogers*

258. *Social and Cultural History of the Graeco-Roman World.* The Roman Empire as the trustee of Hellenism and Christianity, and its own original contributions to modern civilization; lectures, readings, and discussions. This course continues 257 and will not be separately credited. 3 units. *Professor Rogers*

259-260. *The Emergence of the New South, 1865 to the Present.* Reconstruction, industrialization, and agrarian revolt; changing status of the Negro; the South's role in the reform movements headed by Theodore Roosevelt, Woodrow Wilson, and Franklin D. Roosevelt. 6 units. *Professor Durden*

261-262. *Problems in Soviet History.* Studies in the background of the Revolution of 1917 and the history and policies of the Soviet state. 6 units. *Associate Professor Lerner*

263-264. *American Colonial History and the Revolution, 1607-1789.* The founding and institutional development of the English colonies; the background, progress, and results of the Revolution. 6 units. *Professor Alden*

265-266. *Modern South America.* Political, social, and economic history of leading South American nations from the mid-nineteenth century to the present. 6 units. *Associate Professor Van Aken*

269. *British History, 1688-1867.* The Glorious Revolution, evolution of constitution, political methodology, Industrial Revolution, reforms, are among topics considered in context of the relationship of ideas and events. 3 units. *Professor Hamilton*

270. *British History from Mid-Nineteenth Century.* Liberals and Conservatives, Irish Home Rule, the empire, wars and economic decline, the welfare state. 3 units. *Professor Hamilton*

285. *Origins of Indian Civilization.* A study of the main sources and traditions of the classical civilization of the Indian subcontinent with particular attention to religious movements and institutions. (Also listed as Religion 285.) 3 units. *Associate Professor Sullivan*

297. *The British Empire in the Nineteenth Century (From 1783).* The development of the Empire from the American Revolution to the imperialism that culminated in the South African War. 3 units. *Professor Preston*

298. *The Commonwealth in the Twentieth Century.* The origins and

evolution of the Commonwealth of Nations and its adjustment in the age of anti-colonialism. 3 units. *Professor Preston*

For Graduates

303-304. *The United States in the Twentieth Century.* The emergence of the United States as a major power; attention is focused on domestic developments and conflicting theories of expansion and federal power. Emphasis in the first semester is on the progressive era and the first World War; the second semester is devoted to the twenties and to the Franklin Roosevelt administration. 6 units. *Professor Watson*

305-306. *Seminar in British History.* The work consists of practical training in the methods of historical research based on sources for modern British history. 6 units. *Professors Ferguson and Hamilton*

307-308. *Seminar in United States History.* 6 units. *Professors Holley and Watson, and Associate Professor Durden*

309-310. *Seminar in American Colonial and Revolutionary History.* 6 units. *Professor Alden*

315-316. *Seminar in Southern History.* Year course. 6 units. *Professor Woody*

317-318. *Seminar in the History of Western Europe.* 6 units. *Professors Colton and Parker, and Associate Professor Scott*

321-322. *Seminar in the History of Spain, Hispanic America, and Inter-American Relations.* 6 units. *Professor Lanning*

343-344. *Seminar in the History of American Foreign Relations.* 6 units.

347-348. *Seminar in Recent India.* 6 units. *Professor Crane*

353-354. *Seminar on the Second British Empire and the Commonwealth of Nations.* 6 units. *Professor Preston*

361-362. *Seminar in the History of Russia.* 6 units. *Professor Curtiss*

401. *Seminar in the British Commonwealth.* 3 units. *Professors Cole, Hamilton, and Spengler*

410. *Seminar in the Government, History, and Social Structure of India and Pakistan.* 3 units. *Professor Braibanti, Visiting Professor Islam, Associate Professor Sinha*

Historiography and the Teaching of History

For Graduates

312. *Seminar in the Teaching of History in College.* The work in this course is intended to acquaint students with the problems involved in teaching history in college. It includes critical observation of the teaching by members of the History staff in Duke University. Year course. 2 units. *Professor Manchester*

This course is required of all candidates for the degree of Doctor of

Philosophy who are in residence as many as two years at Duke University.

320. *Historiography.* A critical study of the process of finding, appraising, and interpreting the sources of history and of the presentation of the results in narrative. Works of important historians from Herodotus to the present are analyzed. The student undertakes specific exercises in research, criticism, and narration. There is consideration of such general topics as schools, theories, philosophies, and the function of history. Year course. 4 units. *Professor Parker*

This course is required of all candidates for the degree of Doctor of Philosophy who are in residence as many as two years at Duke University.

Hospital Administration

Professor Brown, *Program Director* (234-B Baker House); Professor Frenzel; Associate Professor Swanson; Assistant Professor Smith, *Coordinator of Graduate Studies* (234-B Baker House)

Graduate study leading toward preparation for a career of administration in hospitals and other health agencies is offered through a 24-month program leading to the M.H.A. Degree. The program in Hospital Administration is composed of 36 graduate units, of which 18 are in Hospital Administration and 18 are in designated courses in Economics, Political Science, and Sociology. Included in the program is a 12-month administrative residency, a period of supervised administrative experience conducted under faculty supervision in hospitals and other health agencies located within commuting distance of the University campus. Admission to this program is limited to 12 students per year; selection is based on suitability for management of health agencies as well as on capability for graduate study. As there are requirements for participation in the program in Hospital Administration in addition to basic admission requirements of the Graduate School, interested individuals should obtain complete information on prerequisites and selection procedures from the Coordinator of Graduate Studies.

201. *History and Development of Hospitals and other Health Agencies.* This course is designed to give the student a broad concept of the health field. It includes a study of the evolution of health institutions; analysis of medical care organizations in the United States, and the emergence of the health professions. 3 units. *Assistant Professor Smith*

203-204. *Principles of Organization and Management of Hospitals and Other Health Agencies.* A study of the hospital as an institution including its administrative structure, relationship of the medical staff, and the organization and function of each department. At the same time study is made of the general principles underlying administration so that the student can relate these general principles to the hospital situation.

Emphasis is placed on the financial, legal, staffing, community relation-

ship, and other managerial considerations of hospital administration. 6 units. *Professors Brown and Frenzel, Associate Professor Swanson, Assistant Professor Smith*

211-212. Seminars in Health Administration. A series of seminars designed to complement and add depth to the material covered during the first year, to analyze further the operation of hospitals and other health agencies, and to make the experiences of the residency meaningful.

Attention will be given to formalized techniques of problem-solving, decision-making, human relations, communications, and relating day-to-day experiences to the management process.

Special emphasis will be placed on social and economic aspects of health care and on identifying and projecting current trends in the health field. 6 units. *Staff and Preceptors*

215. Administrative Residency (1 calendar year). Designed to give the student broader and deeper knowledge and understanding of hospitals and other health agencies through practical experience. Varied experience is provided by rotation through a university medical center, a community hospital, a Veterans Administration and special hospitals, a public health department, a prepayment plan, and other governmental and voluntary health agencies. Two months of the residency will be spent in field experience with the Hospital Section of The Duke Endowment. 3 units. *Staff and Preceptors*

Mathematics

Professor Gergen, *Chairman* (135C Physics Building); Professor Warner, *Director of Graduate Studies* (135D Physics Building); Professors Carlitz, Dressel, Elliott, Murray, Roberts, and Shoenfield; Associate Professors Burlak, Gallie, Reynolds, and Williams; Assistant Professors Bryson, Burdick, Hinrichs, Hodel, Kitchen, Scoville, Smith, Stackelberg, and Wonnacott; Adjunct Professor Sewell

Graduate work in the Department of Mathematics is offered leading to the A.M. and Ph.D. degrees. The student, in his undergraduate work, must have had courses in differential and integral calculus, and at least 6 semester hours of other courses in mathematics on the junior or senior level.

The A.M. degree with a major in mathematics is awarded primarily on the basis of scholarship. Of the 24 units of course work required for this degree, 18 units must be taken in the Department of Mathematics.

The Ph.D. degree in mathematics is awarded upon the demonstration of ability and training in research. The original dissertation, therefore, is the most important of the formal requirements for the degree.

Since a reading knowledge of French, German, and Russian is highly

desirable for the student of mathematics, he should satisfy the language requirements in two of these languages as early as possible.

213-214. *Modern Algebra.* Construction of the number system. Introduction to groups, fields, rings, vector spaces, linear transformations, matrices. 6 units. (1966-67, Retired Officers, Program only.) *Professor Roberts*

215-216. *Intermediate Analysis.* Elements of the theory of functions, principally for real variables. Sequences and series, continuity, differentiation, integration. 6 units. (1966-67, Retired Officers Program only.) *Professor Gergen*

217-218. *Analysis.* Introduction to set theory, construction of real and complex numbers beginning with the Peano postulates, elementary topology of real and complex numbers, properties of continuous functions, derivatives, mean value theorem, Riemann integral, fundamental theorem of integral calculus. Prerequisite: Mathematics 64 for 217; and 217 for 218. 6 units. *Staff*

221. *Digital Computer.* History of computers; number representation, information storage, logical arithmetic; components and organization of computing systems; coding and programming; compilers; error analysis. A fee of \$8.00 to provide for materials and clerical services of the Computing Laboratory is charged for this course. The fee is payable to the Treasurer's Office of Duke University at the beginning of the semester. 3 units. *Assistant Professor Patrick*

222. *Introduction to Numerical Analysis.* Error analysis; real and complex roots of equations; finite difference methods and theory of interpolation; numerical differentiation and integration; numerical integration of ordinary and partial differential equations; simultaneous equations and matrix inversion. Prerequisite: Mathematics 221. 3 units. *Associate Professor Gallie*

227-228. *Theory of Numbers.* Congruences, arithmetic functions, compound moduli, quadratic reciprocity, Gauss sums, quadratic forms, sums of squares. Prerequisite: Calculus. (1966-67) *Professor Carlitz*

229-230. *Algebraic Numbers.* Ideals, unique factorization, divisors of the discriminant, determination of the class number. Prerequisite: theory of equations. 6 units. (Not 1966-67) *Professor Carlitz*

233. *Statistical Methods.* Parameter estimation and hypotheses testing from samples, linear regression, correlation, analysis of variance and covariance, components of variance, multiple regression. 3 units. *Assistant Professor Bryson*

234. *Sample Designs.* Methods of constructing and analyzing survey designs; elements of simple random sampling, stratified sampling, multi-stage sampling; methods of estimation; questionnaire construction; refusals and not-at-homes. Prerequisite: Mathematics 233. 3 units. *Assistant Professor Bryson*

235-236. *Abstract Algebra.* Groups, fields, rings, matrices, quadratic

and bilinear forms, general Galois theory, hypercomplex systems. Prerequisite: calculus. 6 units. *Assistant Professor Smith*

244. *Design of Experiments.* Methods of constructing and analyzing designs for experimental investigations, Latin square, split-plot, simple and partially confounded factorial designs, incomplete block designs, treatment of missing data, techniques of experimentation. Prerequisite: Mathematics 233. 3 units. *Assistant Professor Burdick*

245-246. *Combinatorial Analysis.* Generating functions, permutations, distributions, partitions, compositions, trees, and networks. Prerequisite: calculus. 6 units. (Not 1966-67) *Professor Carlitz*

247-248. *Arithmetic of Polynomials.* Field theory, detailed study of finite fields, special polynomials and functions, valuation theory, the zeta function. Prerequisite: Mathematics 236 or consent of the instructor. 6 units. (Not 1966-67) *Professor Carlitz*

262. *Non-Parametric Statistics.* A study of statistical tests in which no assumption about the underlying distribution is made; one sample, two sample, k sample tests for nominal, ordinal and internal scales; non-parametric measures of correlation, efficiency of tests. Prerequisite: Mathematics 244, or consent of the instructor. 3 units. *Assistant Professor Bryson*

271-272. *Introductory Topology.* Basic set theory; topological spaces; separation axioms; metric spaces; continuity; connectedness; paracompactness. Prerequisite: calculus. 6 units. *Assistant Professor Hodel*

273-274. *Algebraic Topology.* Homology and cohomology theories; complexes; introduction to homotopy groups; Čech homology theory. Prerequisite: Mathematics 271-272. 6 units. (Not 1966-67) *Assistant Professor Hinrichs*

283. *Probability for Engineers.* Basic probability concepts, the sample space, discrete and continuous events, permutations and combinations, conditional and marginal probability, discrete and continuous distributions, expected values and moments, sampling distributions, estimation, hypothesis testing, confidence intervals, multiple regression, one-way analysis of variance. Prerequisite: calculus. 3 units. *Assistant Professor Burdick*

285. *Applied Mathematical Methods I.* Vectors, line and surface integrals, tensors, complex variables, differential and integral equations. Prerequisite: Mathematics 64. 3 units. *Professor Dressel*

286. *Applied Mathematical Methods II.* Wave equation, Fourier series, heat equations, telegraphic equation, Legendre polynomials, Bessel functions, Schrodinger's equation. Prerequisite: Mathematics 64. 3 units. *Professor Dressel*

287-288. *Foundations of Mathematics.* Propositional calculus, predicate calculus, axiomatized number theory. Gödel completeness and incompleteness theorems. Recursive functions; hierarchies; constructive ordinals. Set theory; consistency of the axiom of choice. Prerequisite: Mathematics 63, or consent of the instructor. 6 units. *Professor Shoenfield*

289. Applications of Stochastic Processes I. Recurrent events, random walk, Markov chains and processes, queueing theory, branching and diffusion processes. Prerequisites: Mathematics 135 and 140, or consent of the instructor. 3 units. *Associate Professor Williams*

290. Applications of Stochastic Processes II. Linear operators, spectral representations, time series, multivariate analysis, auto-regressive schemes, Gaussian processes, cross-correlation functions, smoothing, filtering, prediction, Wiener-Hopf Equation, diffusion processes, Fokker-Planck Equation, first-passage times. Prerequisite: Mathematics 289 or consent of the instructor. 3 units. *Associate Professor Williams*

291-292. Theory of Functions. Limits, implicit functions, power series, double series, Cauchy's theorem and its applications, residues, Riemann surfaces, conformal mapping. Prerequisite: calculus. 6 units. *Assistant Professor Kitchen*

For Graduates

303. Advanced Theory of Numbers. Cubic and quartic reciprocity, partitions and diophantine analysis. Prerequisite: Mathematics 228, or consent of instructor. 6 units. (Not 1966-67) *Professor Carlitz*

325-326. Real Variable. Number system. Lebesgue and Stieltjes integrals, topics in Fourier series. Prerequisite: Mathematics 291-292. 6 units. *Assistant Professor Scoville*

327-328. Partial Differential Equations. Boundary and initial value problems, regularity and existence theorems by methods of *a priori* estimates and functional analysis. Representations of solutions, spectral theory, and potential theory. Prerequisite: Mathematics 291-292, or consent of the instructor. 6 units.* *Associate Professor Burlak*

331-332. Advanced Topics in Complex Variables. Entire and meromorphic functions; harmonic functions and potential theory; Riemann surfaces; several complex variables. 6 units. (Not 1966-67) *Staff*

333-334. Analytic Theory of Numbers. Distribution of primes, primes in an arithmetic progression, Waring and Goldbach problems, applications of elliptic functions. Prerequisite: Mathematics 291-292. 6 units. (Not 1966-67) *Professor Carlitz*

343-344. Ordinary Differential Equations. Solution by separation of variables, exact differentials, integrating factors, solution in series. Cauchy's existence theorem, linear differential systems, singular points, partial differential equations equivalent to ordinary systems. Prerequisite: Mathematics 291-292. 6 units. (Not 1966-67) *Staff*

371-372. Dimension Theory. Theory of covers in normal spaces; inductive and covering dimension of metric spaces and of normal spaces; dimension of Euclidean spaces; mapping in spheres and applications; metric dimension and other metric-dependent functions. Prerequisite: Mathematics 271-272. 6 units. *Professor Roberts*

383-384. Lie Groups and Algebras. Differential manifolds; Lie groups;

one-parameter subgroups; Lie algebras; differential forms; classification and representations of compact Lie groups and semisimple Lie algebras; solvable and nilpotent algebras; Ado's theorem. Prerequisites: Mathematics 236 and either Mathematics 272 or 292. (1966-67) *Professor Shoenfield*

395-396. Topological Algebra. Normed and locally convex spaces, Banach algebras. Prerequisites: Mathematics 236 and 292, or consent of the instructor. 6 units. (1966-67) *Professor Warner*

397-398. Seminar in Algebra and Number Theory. Prerequisite: consent of the instructor. 6 units. (1966-67) *Professor Carlitz*

Microbiology and Immunology

Professor Conant, *Chairman* (321 Bell Building); Professor Day, *Director of Graduate Studies* (1540 Hospital (CRU)); Professors Amos, Beard, Larsh, Rundles, Smith, and Willett; Associate Professors Metzgar and Osterhout; Assistant Professors Burns and Zmijewski; Instructor Flanagan

The Department of Microbiology and Immunology offers courses of study leading to A.M. and Ph.D. degrees. A description of the departmental facilities, staff, and Ph.D. and Masters programs can be obtained by writing to the Director of Graduate Studies. Special trainee stipends are available to a limited number of deserving applicants each year.

M211. Hematology. Three lectures and three laboratory periods of 3 hours each, weekly, for eleven weeks in the spring quarter. Prerequisites: courses in general zoology, general botany, histology, and comparative anatomy. 4 units. *Professor Rundles*

M221. Bacteriology and Immunology. This course is devoted primarily to the study of the biological and immunological relationships of microorganisms (bacteria, fungi, Rickettsia, and viruses) in disease. Five lectures, two 1-hour conferences, and three laboratory periods of 3 hours each weekly, in fall quarter. Prerequisites: courses in general zoology, general botany, histology and comparative anatomy, general and organic chemistry. 6 units. *Professors Amos, Conant, Day, D. T. Smith, Willett; Associate Professors Metzgar, Osterhout; Assistant Professors Burns, Zmijewski; Instructor Flanagan*

M291. Medical Parasitology. One lecture and one three-hour laboratory period per week for eleven weeks during the fall quarter. Prerequisites: courses in Zoology 204, general botany, histology and comparative anatomy. 1 unit. *Professors Conant and Larsh*

M231. Fundamentals of Immunology. A lecture course on general immunology including the following: non-specific factors in immunity, nature of antigens and antibodies, antibody production, complement, serological methods, blood groups, autoimmune diseases, tumor, im-

munity, transplantation immunity, and hypersensitivity. 2 units. (Spring Semester) *Professors Amos, Day; Associate Professor Metzgar; Assistant Professor Zmijewski*

310. Microbial Physiology. A lecture course devoted to an analysis of the structure and composition of microbes as related to function and growth. Attention will be given to microbial metabolism with emphasis on mechanisms controlling the production and utilization of metabolites. Two lectures per week. Prerequisite: Biochemistry 201 or equivalent. (Spring, alternate years; given 1966.) *Assistant Professor Burns*

311. Advanced Immunology. Genetic control of antigen production, development of antigens in embryogenesis, destruction of antigens in tissue, relationship to differentiation, aggregation. Theories of antibody formation. Nature of antibodies; combining site; antibodies of similar specificity but different properties, reactivity of antibody fractions. Mechanisms of tolerance and immunological paralysis, split and partial tolerance, immunological enhancement. Cellular immunity and the reactions of circulating and cytophilic antibody. Homograft rejections and auto immunity and delayed hypersensitivity. 2 units. *Professors Amos, Day; Associate Professor Metzgar; Assistant Professor Zmijewski*

312. Cancer Immunology. An intensive and critical analysis of progress in a major branch of immunological research covering cancer antigens, the tumor-homograft reaction, and the immunotherapy of cancer. Prerequisite: consent of the instructor. 2 units. *Professor Day*

313. Immunohematology. A lecture and laboratory demonstration course covering the serological, genetic, and anthropological aspects of human blood groups isoantigens and antibodies. 2 units. *Assistant Professor Zmijewski*

314. Immunochemistry. The structure of antibody molecules. The nature of the combining site. The hapten as a molecular probe. Forces involved in antigen-antibody interaction. Specificity, avidity, and cross-reaction of antibodies. Purification of antibodies. Antibodies as analytical reagents. Prerequisites: Fundamentals of Immunology or Biochemistry or Physical Chemistry or consent of instructor. 2 units. *Professor Day*

315. Methods in Immunology. This is essentially a laboratory course in which the student will become familiar with the following methods of immunology: agar precipitation, immunoelectrophoresis, direct agglutination, indirect agglutination, immunofluorescence, complement-fixation and passive cutaneous anaphylaxis. 3 units. *Associate Professor Metzgar Assistant Professor Zmijewski*

316. Antigenic Factors in Graft Rejection. Production of inbred and coisogenic strains. Mutation and recombination in inbred animals and tumors. Genetic control of histocompatibility iso-antigens in tumors and normal tissues, differential gene action in hybrids and tumors. Antigenic and immunologic factors in homograft rejection, tests for genetic compatibility. Modification of the immune response by genetic or immuno-

logic procedures—tolerance, enhancement, suppression of antigens. 2 units. *Professor Amos*

323. *Readings in Bacteriology and Immunology.* This course is intended primarily for graduate students majoring in bacteriology, but it is also available as a minor to other graduate students in related fields, to whom it is recommended by respective supervising committees and with the approval of the Department of Microbiology. Prerequisites: Bacteriology and Immunology, M221. 4 units per semester. *Professor Smith*

324. *Research Seminar on Viruses.* Limited to advanced students. 2 units per semester. *Professor Beard*

325. *Medical Mycology.* This course is intended to familiarize the graduate student majoring in mycology with the fungi causing disease in man and animal. The course includes practical laboratory work with materials from patients in Duke Hospital and those sent to the Duke Fungus Registry from outside sources. Prerequisites: A.M. in Botany with major in mycology and M221. Course limited to four students each year. 4 units per semester. *Professor Conant*

326-327. *Microbiology Seminar.* Graduate students and staff meet weekly to discuss and review recent microbiological literature. Required of all graduate students who are candidates for the A.M. or Ph.D. degree. 2 units.

328. *Seminar in Immunology.* Selected topics on various aspects of immunology will be discussed. Seminars will be by both students and faculty. 1 unit. Spring semester. *Associate Professor Metzgar*

Pathology

Professor Kinney, *Chairman* (301B Medical School); Professor Nathan Kaufman, *Director of Graduate Studies* (301 Medical School); Professors Hackel, Vazquez, and Vogel; Associate Professors Fetter, Smith, Sommer, Trump, and Wittels; Assistant Professors Elchlepp and Sage

The graduate program in pathology is intended to prepare well-qualified individuals for a career in academic and experimental pathology and give them sound understanding of the structural and chemical processes which are involved in disease. The study of pathology brings together structure and function into one discipline by utilizing modern chemical, biologic, and ultrastructural techniques.

M350. *Human Pathology.* The fundamentals of pathology are presented to the student. Lectures developing broad concepts of disease processes are given by the members of the senior staff. The emphasis is placed on etiology and pathogenesis of disease and the experimental ap-

proach to an understanding of disease. Prerequisite: by permission of instructor. Lecture and conferences. 4 units. *Dr. Kinney and Staff*

M351. Correlative Pathology. In this course gross and microscopic material is correlated and related to disease processes. Laboratory and conferences with small groups of students are scheduled for the purpose of more intimate discussion. Laboratory and conferences. Prerequisite or concurrent: Pathology 350. 4 units. *Dr. Kinney and Staff*

M352. Basic Problems in Chemical Pathology. This is an advanced seminar tutorial course in which the biochemical and physiological expressions or morphologic abnormalities will be explored. A specific organ system, namely the heart, will be used as a model for instruction and discussion. Experimental approaches toward solutions of problems will be discussed. Prerequisite: by permission of instructor. 2 units. *Dr. Wittels*

M353. Advanced Neuropathology. This course deals with current problems and research methods related to diseases which affect the nervous system. Prerequisite: by permission of instructor. 2 units. *Dr. Vogel*

M354. Immunopathology. The first part of the course will deal with a conceptual approach to basic immunology with emphasis on immunologic theory of antibody synthesis, tolerance, and autoimmunity. In addition, an introduction to the methodology of immuno-chemistry will be given. The main aspect of the course will emphasize pathogenetic concepts of experimental and human diseases of "hypersensitivity origin" particularly the study of the function and morphology of pathologic states. Prerequisite: by permission of instructor. 2 units. *Dr. Vazquez and Staff*

M355, M356. Seminar in Pathology. Weekly discussions outlining the scope of modern pathology. This will include reports of original researches by members of staff and visitors. 1 unit each semester. *Members of Staff*

M357. Research in Pathology. Independent research projects in various fields of pathology. Time and credit to be arranged. *Members of Staff*

M358. Cellular Ultrastructure in Pathology. This course is designed for students wishing to broaden their knowledge of cellular structure and cellular pathology. The course will consist of a series of lectures and seminars discussing the alterations in cellular structure and associated function that accompany cell injury. Prerequisite: by permission of instructor. 2 units. *Dr. Trump and Staff*

M359. Applied Instrumentation to the Field of Ultrastructural Pathology. Emphasis will be placed on the theory and application of electron microscopy to ultrastructural pathology. The methods relating to electron microscopy as well as phase and polarization microscopy will be considered. Lectures, seminars, and laboratories. 2 units. Prerequisite: Concurrent or previous enrollment in M358. *Dr. Trump and Staff*

Philosophy

Professor Baylis, *Chairman* (212D West Duke Building); Professor Welsh, *Acting Chairman and Director of Graduate Studies* (212A West Duke Building); Professors Clark, Negley, and Peach; Associate Professor Wilson; Assistant Professors Binkley and Spector

The Department of Philosophy offers graduate work leading to the A.M. and Ph.D. degrees. Tutorial work complements formal instruction. Students may specialize in any of the following fields: the History of Philosophy; Logic; Philosophy of Science; Epistemology; Metaphysics; Philosophical Analysis; Ethics; Aesthetics; Political Philosophy and Philosophy of Law. Applicants for admission should offer scores of the Graduate Record Examination or the Miller Analogies Test. Scores are required of applicants for an award.

Individual programs of study are developed for each student. The following requirements, however, are fundamental: (1) In February of their first year new graduate students in philosophy who are not then taking the preliminary examinations for the Ph.D. are required to take three qualifying examinations: one in the history of philosophy, ancient and modern; one on a central philosophical topic, treated systematically; and one in logic, both classical and symbolic. The examination in logic will be waived if, during the first semester, a student has passed with a grade of E or G Philosophy 331c, Logic. A student's achievement on these examinations will be regarded as indicative of his ability to undertake advanced graduate work. (2) Preliminary examinations for the Ph.D., which may be taken only after a student has met the language requirements for that degree, should be taken during the first year of study beyond the A.M. degree, but in any case not later than the end of the second year. In these examinations students are expected to combine historical knowledge with critical understanding.

Work in a minor field outside of the Department, but not necessarily confined to any one department, must include six units for the A.M. or the Ph.D. and may include more as a student's program requires or permits.

For Seniors and Graduates

202. *Aesthetics: The Philosophy of Criticism.* A study of some fundamental issues in aesthetics with particular reference to the fields of literature, music and painting. Problems discussed include the role of standards in criticism, aesthetic judgment, interpretation and evaluation in literature, meaning in the arts, art and truth, the arts and morality. 3 units. Professor Welsh

203. *Contemporary Ethical Theories.* Study of the nature and justification of basic ethical concepts and principles in the light of the chief ethical

- theories of twentieth-century British and American philosophers. 3 units. *Professor Baylis and Assistant Professor Binkley*
- 205. *Philosophy of History.*** Discussion of the method, metaphysical implications and influence of interpretations of history: Hegel, Marx, Spengler, Toynbee. 3 units. *Professor Negley*
- 208. *Political Values.*** Analysis of the systematic justification of political principles and the status of political values in the administration of law. 3 units. *Professor Negley*
- 211. *Plato.*** A critical study of the dialogues with special emphasis on problems in ethics, epistemology, and metaphysics. 3 units. *Assistant Professor Binkley*
- 217. *Aristotle.*** A study of parts of the *Organon*, *Physics*, and *Metaphysics*. 3 units.
- 218. *Medieval Philosophy.*** An examination of the course of philosophy from the end of the ancient period to the fifteenth century. Special attention will be given to Augustine, Avicenna, Averroes, Albert the Great, Aquinas, Siger of Brabant, John of Jandun, Duns Scotus and William of Occam. 3 units.
- 219. *Kant.*** Reading and discussion of his philosophy, with some attention to historical continuity. 3 units.* *Professor Negley*
- 225. *British Empiricism.*** A critical study of the writings of Locke, Berkeley, or Hume, with special emphasis on problems in the theory of knowledge. 3 units. (Not 1966-67) *Professor Peach*
- 227. *Continental Rationalism.*** A critical study of the writings of Descartes, Spinoza, or Leibniz, with special emphasis on problems in the theory of knowledge and metaphysics. 3 units. (1966-67 Descartes) *Professor Peach*
- 228. *Recent and Contemporary Philosophy.*** A critical study of some contemporary movements in philosophy with special emphasis on the work of Moore, Russell, Wittgenstein, Wisdom, and Ryle. 3 units. *Professor Welsh*
- 229. *American Pragmatism.*** Studies in the philosophy of Peirce, James, Dewey, and Mead. 3 units.* *Professor Welsh*
- 230. *The Meaning of Religious Language.*** An analysis of the credentials of some typical claims of theism in the light of theories of meaning in recent thought. Prerequisite: Contemporary Theology 232-233 or consent of instructor. (Also listed as Religion 230.) 3 units. *Associate Professor Poteat*
- 233. *Introduction to the Philosophy of Science.*** A systematic study of some central problems in the methodology of the sciences, e.g., the concept of a scientific explanation, theory and observation, and other topics. 3 units. (1966-67) *Assistant Professor Spector*
- 234. *Philosophy of Science.*** Selected problems in the physical and non-physical sciences. Topics such as space, time, measurement, probability, and induction, and problems in the philosophy of the behavioral and

social sciences. Prerequisite, Philosophy 233. 3 units. (Not 1966-67) *Assistant Professor Spector*

235. *Philosophy and the Sciences.* An introduction to the philosophy of science with emphasis on the writings of philosophers and scientists in the history of science, such as Galileo, Newton, Mach, Poincare, and Einstein. 3 units. (Not 1966-67) *Assistant Professor Spector*

236. *Special Problems in the Philosophy of Science.* Selected topics concerning the methods of the sciences and the philosophy of science. Prerequisite: previous work in the philosophy of science or the consent of the instructor. 3 units. (1966-67) *Assistant Professor Spector*

241. *Logic.* Fundamental Problems of Logic. 3 units.* *Professor Clark and Associate Professor Wilson*

246. *General Semantics and Theory of Language.* An examination of semantical theory through Frege, Russell, Carnap and Quine, together with a consideration of the implications of meaning theory for general philosophy. 3 units.* *Associate Professor Wilson*

250. *Philosophical Analysis.* A critical study of recent and contemporary essays in philosophical analysis, and an evaluation of the nature, methods, and results of this movement. 3 units. *Professors Baylis, Clark, and Assistant Professor Binkley*

252. *Metaphysics.* A critical and evaluative study of rival metaphysical theories and their bases. Analysis of the fundamental metaphysical categories and of metaphysical methods. 3 units. *Professor Baylis*

287-288. *Foundations of Mathematics.* Propositional calculus, predicate calculus, axiomatized number theory. Godel completeness and incompleteness theorems. Recursive functions; hierarchies; constructive ordinals. Set theory; consistency of the axiom of choice. Prerequisite: Mathematics 53, or consent of instructor. 6 units. (Also listed as Mathematics 287-288.) *Associate Professor Shoenfield*

291, 292. *Critical Philosophy.* The analysis of basic philosophical concepts and beliefs with a view to critical evaluation and constructive emendation of them. Emphasis on the practice as well as the principles of philosophical criticism and problem-solving. 3 units each. Enrollment only by permission of the Department. 291 is ordinarily prerequisite for 292. *All Members of the Graduate Staff*

For Graduates

331, 332. *Seminar in Special Fields of Philosophy.* 3 units. *All Members of the Graduate Staff*

Physics

Professor Fairbank, *Chairman* (119 Physics Building); Professor Greuling, *Director of Graduate Studies*; Professors Biedenharn, Fowler, Gordy,

Lewis, Meyer, Newson, Nielsen; Associate Professor Robinson; Assistant Professors Bulpuch, Evans, Fortney, Hunt, Roberson, Tilley, and Walter; Instructors Cook, Guyer, and Richardson

The Department of Physics offers graduate work leading to the A.M. and Ph.D. degrees. Course work is designed to give a broad basic foundation in classical and modern physics. All graduate students will be expected to acquire a thorough knowledge of the various branches of classical physics and some familiarity with modern physics and with basic laboratory skills. They will be required to take such course work in the 200-number courses as may be necessary to obtain this foundation.

The student will be required to take such course work as will best be adapted to the kind of work he will subsequently specialize in and to the kind of research he will undertake. The choice of minor will be similarly determined.

Since a practical reading knowledge of French and German is highly desirable for the student of physics, he should satisfy these language requirements as early as possible.

For Seniors and Graduates

201-202. Mechanics. The fundamental principles of Newtonian mechanics; general dynamics of systems of particles and rigid bodies; the methods of Lagrange and Hamilton; generalized mechanics. Prerequisite: Physics 125. 6 units. *Professor Greuling, Assistant Professor Fortney*

213-214. Contemporary Physics. A course which covers the fundamental concepts and the experimental basis of modern physics. 6 units. *Assistant Professor Walter*

217-218. Advanced Physics Laboratory. Measurements involving the fields of mechanics, electricity, magnetism, heat, sound, optics and modern physics. 2-6 units. *Instructor Richardson*

220. Advanced Electronics. Vacuum tubes and solid state devices, advanced circuit analysis. 3 or 4 units. *Assistant Professor Hunt*

221-222. Theoretical Physics. Mechanics of particles and of rigid bodies, elasticity, fluids dynamics, electrodynamics; optics, relativity, thermodynamics, statistical mechanics, wave mechanics. Prerequisite: Mathematics 285-286 or equivalent to be taken at least concurrently. 6 units. *Instructor Cook*

223-224. Electricity and Magnetism. Electrostatics, magnetostatics, and potential theory; dielectric and magnetic media; magnetic field of currents and the law of induction. Maxwell's electrodynamics, theory of wave optics, refraction, interference, and diffraction. Prerequisite: Physics 126. 6 units. *Associate Professor Robinson*

For Graduates

303, 304. Thermodynamics, Statistical Mechanics. Fundamental laws of thermodynamics and statistical mechanics with applications to physics and

chemistry. Properties of gases and elements of quantum statistics. 6 units.
Instructor Guyer

306. Low Temperature Physics. A study of the properties of matter near the absolute zero of temperature; superconductivity, liquid helium, adiabatic demagnetization. Prerequisite: Physics 303. 3 units.* *Professor Fairbank*

309. Solid State. A study of matter in the condensed state, including metals, insulators and semiconductors; theory of cooperative effects; thermal and magnetic properties of matter. Prerequisite: Physics 303. 3 units. *Professor Meyer*

310. Advanced Solid State Physics. Scattering from many particle systems, Fermi liquids, systems of bosons, and superconductivity. Prerequisite: Physics 316. 3 units. *Instructor Guyer*

315-316. Principles of Quantum Theory. Original and fundamental concepts of quantum theory; wave and matrix mechanics; theory of measurements; exclusion principle and electronic spin. Prerequisite: Physics 201-202. 6 units. *Professor Biedenharn*

317. Intermediate Quantum Theory. General operator methods; angular momentum; Dirac electron theory. Second quantization; symmetry principles and conservation theorems. Applications to the theory of solids, of nuclei, and of elementary particles will be stressed. Prerequisite: Physics 315-316. 3 units. *Assistant Professor Evans*

319. Electromagnetic Field Theory. Radiation of electric and magnetic multipole fields; special relativity; covariant electrodynamics; Lienard-Wiechert potentials; scattering and dispersion; Hamiltonian field equations. Prerequisite: Physics 223-224. 3 units. *Professor Greuling*

323. Theory of Atomic Spectra. Excitation of spectra, computation of wave lengths from photographs of spectra, study of the structure of atomic spectra with applications. 3 units.*

324. Theory of Molecular Spectra. A study of the structure of molecular spectra with applications. 3 units.*

331. Microwave Radiation. Microwave generators, cavity resonators, transmission lines, radiation propagation and detection. 3 units.* *Professor Gordy*

335. Microwave Spectroscopy. Application of microwaves in the determination of molecular, atomic, and nuclear properties. Stark and Zeeman effects in microwave spectroscopy. Magnetic resonance absorption. 3 units.* *Professor Gordy*

341. Advanced Topics in Quantum Theory. Quantum theory of radiation and collisions with special reference to nuclear and high energy physics. Prerequisite: Physics 315-316. 3 units* *Professor Biedenharn*

343. Nuclear Physics. Elementary theory of the deuteron; low energy neutron-proton scattering; theory of nuclear reactions; penetration of potential barriers; nuclear energy levels. Prerequisite: Physics 315. 3 units. *Professor Newson*

344. *Advanced Nuclear Physics.* The deuteron, nuclear forces, scattering of elementary particles, beta-radiation. Other aspects of nuclear physics susceptible of theoretical interpretation. Prerequisite: Physics 343. 3 units.* *Professor Biedenharn*

345. *High Energy Physics.* Experimental and theoretical aspects of high energy nuclear processes; properties of mesons and hyperons. 3 units. (1966-67) *Professor Fowler*

346. *Topics in Theoretical Physics.* The content of this course will vary from year to year. General methods in quantum mechanics such as: group theory and its applications; elementary particle theory; field theory; theory of solids; theoretical nuclear physics; atomic and molecular structure. The topic for Spring 1966 will be group theory. Prerequisite: Physics 315-316. 3 units.* *Professor Biedenharn*

351-352. *Seminar.* A series of weekly discussions on topics related to the research projects under investigation in the department. 2 units. *All Members of the Graduate Staff*

Physiology and Pharmacology

Professor Tosteson, *Chairman* (203 Medical School); Associate Professor Kostyo, *Director of Graduate Studies* (251 Medical School); Professors F. Bernheim, Moore, and Renkin; Associate Professors Blum, Horowicz, Johnson, Long, Ottolenghi and Salzano; Assistant Professors Hochstein, Jöbsis, McManus, and Somjen

In the Department of Physiology and Pharmacology graduate work is offered leading to the A.M. and Ph.D. degrees. Before undertaking graduate work in physiology or pharmacology a student should have a strong background in basic science including course work in mathematics, chemistry, physics and biology. Students are accepted for graduate work who have undergraduate majors in any of the following areas: biology, chemistry, physics, engineering. A brochure is available from the department which describes the program of study, financial assistance, facilities, and the research activities of the staff.

M204. *Topics in Muscle Physiology.* This course will cover the following topics: Cellular basis of activity in skeletal, cardiac, and smooth muscle; ionic properties of muscle membranes; submicroscopic structure of muscle and the molecular basis of contraction; the problem of electro-mechanical coupling; the mechanics and thermodynamics of muscular contraction; design and control problems for the production of movement in various animals. 2 units. *Associate Professor Horowicz*

M205. *Physiological Models.* This course is primarily intended for students with some background in electrical engineering. It will cover the following topics: energy transformation and storage in single cells;

membrane model circuit diagrams and cable properties; membrane non-linear-current relations: nerve impulse transmission; excitation and inhibition; mechanics and thermodynamics of muscles; electrical analysis of cardiovascular-respiratory systems. 3 units. *Professor Moore*

M260. Cellular Aspects of Drug Action. An introduction to cell-drug interaction with emphasis placed on mechanisms of action and structure-activity relationships of chemical agents. Prerequisites: organic chemistry, introductory animal or plant physiology. Undergraduates by permission of instructors. 1 unit. *Professor F. Bernheim and Associate Professor Ottolenghi*

M261-262. Human Physiology. Six lectures and twenty laboratory hours per week. Prerequisites: Anatomy M201 and Biochemistry M241 (or equivalents) and at least one year of college physics. Feb.-June. Credits depending on work taken. (Maximum 8 units.) *All Members of the Graduate Staff*

M271. Contemporary Physiology. Contemporary physiology taught from the current literature. Prerequisite: Physiology M261-262 or the equivalent. 4 units. *All Members of the Graduate Staff*

M279. Introductory Seminar in Physiology. Weekly discussions by the staff outlining the scope of modern physiology. Required of all graduate students majoring in physiology. 1 unit. *All Members of the Graduate Staff*

M365. Respiration and Aero-Physiology. A study of the fundamental respiratory processes in living organisms, and of the special physiological responses and adjustments of the individual during high-altitude flight. Lectures, conferences, laboratory. Prerequisite: M261-262 or equivalent. 4 units. *Associate Professor Salzano*

M369. Pharmacology. Mode of Action of Drugs. Studies and discussions of the pharmacological action of drugs in terms of biochemical and physiological processes. Lectures, conferences, and laboratory. Prerequisite: M261-262 or equivalent. 4 units. *Professors F. Bernheim and Renkin; Associate Professors Johnson and Ottolenghi; Assistant Professor Hochstein*

M370. Seminar. A weekly meeting in which original researches by members of the staff and guests are reported. Required of all graduate students who are candidates for the M.A. or Ph.D. degree. 2 units. *All Members of the Graduate Staff*

M371. Topics in Pulmonary and Cardiovascular Physiology. This course is concerned with processes which account for exchange of gases with the atmosphere, aeration of the blood, transport of oxygen and carbon dioxide, and exchange of gases at the tissues. Emphasis is placed on classical experiments describing physical factors in thoracic motion, ventilation-perfusion relations, function of hemoglobin as carrier of oxygen and carbon dioxide, flow-pressure relations in the gas and blood streams, and factors which disturb the exchange of gases in the pulmonary

and systematic capillaries. Prerequisite: M261-262 or equivalent. 2 units. *Associate Professors Long, and Salzano*

M372. Research. Individual investigations in the various fields of physiology. Credits to be arranged. *All Members of the Graduate Staff*

M373. Cellular Endocrinology. Current concepts of the mechanism of action of hormones are covered with special reference made to the effects of hormones on cell membrane permeability and on the activity of enzyme systems. The relationships of these cellular actions of hormones to the hormonal regulation of growth, metamorphosis, osmoregulation, pigmentation and reproduction are discussed. 2 units. *Associate Professor Kostyo*

M374. Cellular Neurophysiology. Deals with current concepts of structure and electrical impulse propagation in nerves. The powerful new experimental techniques used in the study of isolated membranes and the resulting theoretical models are covered. 2 units. *Professor Moore*

M376. Cellular Metabolism and Energetics. The metabolic activity of cells will be considered from the point of view of the flow of energy through the cell. Special attention will be given to the mechanisms which couple the energy-providing systems to the energy-utilizing systems. Prerequisites: Physiology M261-262 and Biochemistry 201 (or equivalent). 2 units. *Assistant Professor Jöbsis*

M377. Cellular Transport Processes. A sequential study of the following topics: The physical chemistry of transport processes which occur in living cells (e.g. diffusion, flow, electric current); contemporary knowledge of the molecular mechanism of salt and water transport across cell membranes with special reference to the conversion of chemical bond energy to transport work in active transport; the integration of transport processes in individual plasma membranes to accomplish regulation of cytoplasmic salt and water composition and cell volume, as well as the secretion of fluids across epithelial cell layers in organs specialized for this function (intestine, kidney). 2 units. *Professor Tosteson and Assistant Professor McManus*

M378. Reproduction. A lecture and laboratory course dealing with mammalian reproduction. The rat and rabbit will serve as the principal laboratory subjects. The following areas will be covered: embryology of the reproduction system; gonadal structure, gametogenesis and hormone production; structure and function of the diencephalic-pituitary system; structural, chemical, and behavioral actions of sex hormones; mechanisms of fertilization and implantation; placental structure and function; lactation. Admission with approval of instructors. (Listed also as Anatomy M378.) 4 units. *Professor Everett (Anatomy) and Associate Professor Kostyo.*

M379. Physiology of the Central Nervous System. The literature concerned with the integrative aspects of neurophysiology will be explored with emphasis upon the mammalian nervous system. Topics to be

considered include: properties of central neurons, synaptic excitation and inhibition, reflex organization of the spinal cord, receptor organs and sensory codes in the central nervous system, organization of motor functions and integration of autonomic functions. Prerequisite: Physiology M261-262 or equivalent. 2 units. *Assistant Professor Somjen*

Political Science

Professor Hallowell, *Chairman* (307 Library); Associate Professor Proctor, *Director of Graduate Studies* (303 Library); Professors Ball, Braibanti, Cole, Connery, Kulski, Leach, Rankin, and Wilson; Associate Professor Hall; Assistant Professor Kornberg

The Department of Political Science offers graduate work leading to the A.M. and Ph.D. degrees. Before being admitted to candidacy for the Ph.D. degree, an applicant is normally expected to have qualified for the A.M. degree.

Instruction is designed to prepare the student for teaching, for government service, and for other work related to public affairs. Before undertaking graduate study in political science, a student is ordinarily expected to have completed at least 12 semester hours of course work in political science, including some work in American government.

Fields of political science in which instruction is at present offered for candidates for the degree of Doctor of Philosophy are the following: American Government and Constitutional Law; Comparative Government and Politics (with special reference to Western Europe, Southern Asia, the Soviet Union or the Commonwealth); Political Theory; American State and Local Government; International Law and Organization; Public Administration; Political Parties and Voting Behavior. Candidates for the degree of Doctor of Philosophy in political science must elect five fields including Comparative Government and Political Theory; at least one of the five fields must be taken in a department other than the Department of Political Science.

For Seniors and Graduates

207. *American Constitutional Law and Theory.* A study of leading principles of American government, as developed through judicial interpretation of the Constitution. 3 units. *Professor Rankin*

208. *American Constitutional Law and Current National Problems.* A study of the influence of recent Supreme Court decisions upon the political and constitutional development of the United States. 3 units. *Professor Rankin*

209. *Problems in State and Local Government in the United States.* A study of the historical development of the state and local governments,

their present organization and subdivisions and their relation to each other. Special attention is given to the position of the states in the federal union through the study of federal-state, and inter-state, and state-local relations. 3 units. *Professor Leach*

211. *The Judicial Process.* A study of judicial decision-making in the United States. Attention will be focused on the institutional setting and the process of litigation, the recruitment and political socialization of judges, the influences and limitations on judicial decision-making, and the impact of judicial decisions within the political system. Prerequisites: Political Science 127, 207, or their equivalents. Not open to students who have completed Political Science 128. 3 units. *Professor Howard*

221. *International Public Organization.* A study of the structure and functioning of the United Nations organs, of related specialized agencies such as the International Labor Organization, and of regional agencies such as the Organization of American States and the North Atlantic Treaty Organization. 3 units. *Professors Ball and Wilson*

222. *Empirical Theory and Methodology.* The research process in political science in terms of the possibilities for the quantitative analysis of data. Emphasis is on the construction of empirical theory, particularly conceptualization, hypothesis formation and testing. Careful consideration is given to the logic and mechanics of data collection and processing. 3 units. *Assistant Professor Kornberg*

223. *Political Philosophy from Plato to Machiavelli.* An intensive analysis of the political philosophies of Plato and Aristotle followed by a survey of medieval political thought and an analysis of the significance of Machiavelli. 3 units. *Professor Hallowell*

224. *Modern Political Theory.* An historical survey and philosophical analysis of political theory from the beginning of the seventeenth to the middle of the nineteenth century. Attention is given to the rise of liberalism, the Age of Enlightenment, the romantic and conservative reaction, idealism and utilitarianism. 3 units. *Professor Hallowell*

225. *Comparative Government and Politics.* A comparative study of modern political institutions and processes, with particular attention to European constitutional government and politics. 3 units. *Professors Cole and Kulski*

226. *Comparative Government and Politics.* A comparative study of modern political institutions and processes, with particular attention to European totalitarian and authoritarian political systems. 3 units.* *Professors Cole and Kulski*

227-228. *International Law.* Elements of international law, particularly as interpreted and applied by the United States; rights and duties of states with respect to recognition, state territory and jurisdiction, nationality, diplomatic and consular relations, treaties, treatment of aliens, pacific settlement of disputes, international regulation of the use of force, and collective responsibility. 6 units. *Professor Wilson*

229. *Recent and Contemporary Political Theory.* The rise of positivism and its impact upon modern political thought, the origins of socialism, Marxism and its variants, socialism in the Soviet Union, nationalism, Fascism and National Socialism, the crisis in modern democracy, Christianity and the social order. 3 units. *Professor Hallowell*

230. *American Political Institutions.* A study of the formation and development of institutions of the national government in the United States, with historical and analytical treatment. Among other topics, this course is concerned with the Constitutional Convention of 1787, and the development of Congress, the Presidency, and the Supreme Court. 3 units. *Professor Rankin*

231. *American Political Theory.* An analysis of the main currents in American political thought from colonial beginnings to the present day, with emphasis upon the development of liberalism in America. 3 units.* *Professor Hallowell*

234. *Civil-Military Relationships in American Government.* A consideration of the role of the military in American government both in practice and in theory. Special emphasis will be given to formal civil-military structural arrangements for determining policies such as the National Security Council, and to the degree of civilian control within the military establishment. 3 units.* *Professor Connery*

235. *The British Commonwealth.* An analysis of the political relationship between the members of the Commonwealth and a comparative study of the political systems of the Commonwealth countries, with particular reference to Canada. A course designed in part to utilize the occasional services of visiting professors from Commonwealth countries. 3 units. *Professor Cole*

241. *Administrative Management.* An advanced course in public administration with special attention being given to the development of scientific management, its application to government in the United States, and a consideration of current problems in organization, procedures, work simplification, and management improvement. 3 units. *Professor Connery and Associate Professor Hall*

242. *National Administration.* A study of the administrative organization, working concepts and procedures of the United States Government, illustrated through the operations of the Bureau of the Budget. 3 units. *Professor Connery and Associate Professor Hall*

244. *Administrative Law and Process.* The nature and law of the administrative process in the context of American government and politics, with special attention to the powers, procedures, and judicial control of administrative agencies. 3 units. *Associate Professor Hall*

246. *Government Administration and Public Policy.* Through use of the laboratory and case study techniques, a consideration of the types of administrative problems that the United States Government encounters in

the field of public policy, and their possible solution. 3 units.* *Professor Connery*

250. *Comparative Government and Politics: Southern Asia I.* Methodology of comparative political analysis. Institutional, functional problematic and culture-analytic approaches compared. Theoretical problems of induced political and administrative change, using India and Pakistan as case studies. 3 units. *Professor Braibanti*

251. *Comparative Government and Politics: Southern Asia II.* Political modernization of India and Pakistan with emphasis on constitutional change, development of ideology, bureaucratic transition, party politics, law as an instrument of political change, and the community development movement. 3 units.

275. *The National Party System.* An intensive examination of selected facets of American national political parties, such as relationships between presidential and congressional politics, the politics of national conventions, and the controversy over party government. 3 units. *Assistant Professor Kornberg*

276. *Comparative State Parties and Politics.* A selective analysis of party patterns in the states, including such topics as: classification schemes for state party systems, the impact of various nominating procedures on party organization, relationships between national and state politics, and the influence of party system on the operation of state government, with special attention to the South. 3 units.

280. *Comparative Government and Politics—Sub-Saharan Africa.* Particular attention will be given to traditionalism and modernization, ideologies, leadership, party systems, the adaptation of parliamentary institutions, Africanization of the civil services, and the problem of political integration. 3 units. *Associate Professor Proctor*

291. *Problems of Urban Government.* An analysis of problems arising from the structure and functions of urban governments in the United States with particular attention to the current problems of metropolitan areas. 3 units. *Professor Leach*

292. *Urban Administration.* A study of the administration of governmental programs and policies by governments in metropolitan areas with special attention to problems of organization, jurisdiction, and administrative responsibility. 3 units.* *Professor Leach*

For Graduates

301-302. *Departmental Graduate Seminar.* An introduction to research methodology, inter-disciplinary relationships, and current research problems. Required of all graduate majors in political science. No credit. *All Members of the Graduate Staff*

310. *Seminar in State Government.* Open to students who have completed course 209 or its equivalent. 3 units.*

312. *Seminar in Constitutional Law.* Open to students who have com-

pleted courses 207 and 208 or their equivalents. 3 units. *Professor Rankin*

321. *Seminar in Political Theory*. Open to students who have completed 6 units in Political Science 223, 224, 229, 231 or their equivalents. 3 units. *Professor Hallowell*

325. *Seminar in Comparative Government*. Open to students who have completed courses 225 or 226 or equivalents. 3 units. *Professor Cole*

328. *Seminar in International Law*. Open to students who have completed course 227-228 or its equivalent. 3 units. *Professor Wilson*

330. *Seminar in Comparative Government and Politics—Southern Asia*. Emphasis on research using documentary materials relating to India, Pakistan, Ceylon, and Malaya. Open to students who have completed courses 250, 251 or their equivalents. 3 units. *Professor Braibanti*

341. *Seminar in Public Administration*. Directed reading, discussion and reports concerning the theory and practice of public administration. 3 units. *Professor Connery*

360. *Seminar in Russian Government*. Open to students who have completed course 160, or on individual approval. 3 units. *Professor Kulski*

361. *Seminar in Foreign Relations of the Soviet Union*. Open to students who have completed courses 160 or 360, or on individual approval. 3 units. *Professor Kulski*

376. *Seminar in Political Behavior*. Open to students who have completed courses 275 and 276 or their equivalents, or by special approval of the instructor. 3 units.

401. *Seminar in the British Commonwealth*. 3 units. *Professors Cole, Hamilton, Spengler, and Braibanti*

410. *Seminar in the Government, History, and Social Structure of India and Pakistan*. 3 units.* *Professor Braibanti and Associates*

Related Course Work in the School of Law

There may be graduate credit for course work completed in the Duke University School of Law, under regulations referred to on page 7 of this *Bulletin*.

Psychology

Professor Alexander, *Chairman* (240 Psychology-Sociology Building); Professor Guttman, *Director of Graduate Studies* (231 Psychology-Sociology Building); Professors Adams, Brehm, Dai, Diamond, Jones, and Kimble; Associate Professors Altrocchi, Banham, Boneau, Borstelmann, Carson, Erickson, Lakin, Wallach, and Wing; Associate Research Professor Gaffron; Assistant Professors Erickson, Kremen, Lockhead, Schiffman, and Singer; Lecturers Botwinik, Cohen, Crovitz, E., Crovitz, H., Eisdorfer,

Feather, Gehman, Huse, Krugman, Obrist, Peele, Shmavonian, Somjen, Stedman, and Thompson.

The Department offers work leading to the A.M. and Ph.D. degrees. For the Ph.D. degree the areas of concentration are: theoretical experimental psychology, including physiological and comparative psychology; social psychology; and personality clinical psychology. All fields of specialization presuppose thorough preparation in the general methods, data, and theories of psychology. Programs of study are typically arranged to provide this common background in the first year or two, with increasing specialization in course work and research in subsequent years. Early in the second year of residence, the Ph.D. student is expected to have planned his further program of specialized studies; by the end of the second year, when the preliminary examination is normally taken, the doctoral dissertation plan should be formulated. An original dissertation demonstrating independent research competence and scholarship is the most important formal requirement for the Ph.D. degree.

Students specializing in clinical psychology undertake field work in a variety of settings, and an integral part of this program is a one-year internship in an approved and appropriate institution. Clinical internship is arranged for the third year of study or later year, depending on the student's progress and needs.

Minor work in a variety of fields is available, but the areas most relevant to graduate work in psychology are the biological sciences (zoology, neuroanatomy, physiology), mathematics and statistics, sociology and anthropology, and philosophy of science.

Basic preparation in statistics and quantitative methods is normally obtained in the Department of Mathematics. Enrollment in Math 233 and Math 244 is usually required in the first year.

Further details concerning the program of studies in psychology may be obtained from the Director of Graduate Studies in Psychology.

203. *Sensation and Perception.* An examination of the classical concepts in sensation and perception and of the resulting psychophysical data for each of the major senses with emphasis on vision and audition. Modern perceptual formulations are discussed through analysis of the empirical evidence in support of each view. 3 units. *Assistant Professor Lockhead*

204. *Comparative Psychology.* The study of behavior as related to species and of speciation as dependent upon behavior; instinct, imprinting, and learning at different phylogenetic levels. 3 units. *Professor Adams*

213. *Conditioning and Learning.* A presentation of the topics of classical and instrumental conditioning. Emphasis is upon the empirical laws of simple learning. 3 units. *Professor Kimble*

214. *Behavior and Learning Theory.* An examination of concepts and principles of learning and of empirical findings in relation to various

analyses of behavior mechanisms and definitions of behavioral units. 3 units. *Professor Guttman*

215. Developmental Psychology. A consideration of selected research areas in child behavior and development, including personality, cognition, perception and learning. 3 units. *Associate Professor Borstelmann*

216. Biological Psychology. The methods of biology (as applied to psychology), especially in neurophysiology, neuroanatomy and genetics. Topics covered include: (a) the genetics of behavior, (b) the organization of the dorsal thalamus and neocortex, (c) the limbic system and hypothalamus. Methods covered include: (a) ablation method, (b) method of evoked potentials, (c) electrical stimulation of the brain, (d) classical and physiological genetics. 3 units. *Professor Diamond*

217. Research Methods in Social Psychology. The theory and practice of data collection methods in social psychology. Emphasis is on the relation of theories, statistical hypotheses, and operational definitions. The methods include formal scaling procedures, systematic observational techniques, and others appropriate to field studies, field experiments, surveys and laboratory experiments. 3 units. *Professor Brehm*

218. Social Psychology. An examination of selected problem areas in social psychology including social factors in cognition, models of social interaction, conformity and social influence, and attitude development and change. Recent research is emphasized in relation to its historical context and its bearing on the development of theory. 3 units. *Professor Jones*

220. Physiological Bases of Behavior. Classical studies of the neurophysiology of learning and of behaviors such as hunger, thirst, and sex are examined. Emphasis is on the neural, hormonal, and developmental bases of motivational behavior. 3 units.

234. Seminar in Personality. A detailed consideration of selected research topics of current interest in the experimental study of personality, including risk-taking, creativity, and cognitive styles. 3 units. *Associate Professor Wallach*

236. Theoretical Psychology. Survey of representative systematic formulations and schools in historical sequence. Study of relationships between various philosophical, scientific, and cultural thought-patterns and the forms of psychological theories. 3 units. *Professor Guttman*

237. Functional Neurophysiology. This course considers the mechanisms of activity of the individual neuron and groups of nerve cells, the principles of activity of the afferent and efferent neural system, and the integrative and associative functions of the nervous system. Laboratory demonstrations and participation. 3 units. *Associate Professor Erickson*

238. The Electroencephalogram and Psychological Function. A survey of experimental and clinical literature on brain wave correlates of intelligence, personality, behavior disorders, epilepsy, sleep, sensory stimulation, conditioning and learning. Lectures, laboratory demonstrations, and clinical case presentations. 3 units. *Lecturer Obrist*

239. Behavioral Correlates of Brain Damage in Man. A study of the effects of brain damage on psychological functioning. Known brain-behavior relationships in man will be reviewed, and problems encountered in the study of brain function in man will be emphasized. Laboratory demonstrations will be concerned with the assessment of cerebral dysfunction through the use of standard psychological tests. 3 units. *Lecturer Thompson*

245. Personality Theory I. An examination of representative theories of human functioning from Freud through depth and neoanalytic approaches. 3 units. *Professor Alexander or Assistant Professor Kremen*

246. Personality Theory II. An examination of representative models of human functioning from among such approaches as that of field theory, behavior theory, type or trait theory, and ego psychology. 3 units. *Professor Alexander or Assistant Professor Kremen or Assistant Professor Schiffman*

247-248. Personality Assessment. Introduction to the assessment of human personality through the study of personal documents, interview data, objective and projective test material. Laboratory sessions will be concerned with personality assessment of normal human subjects over extended time periods. 3 units each semester. *Professor Alexander or Assistant Professor Kremen*

249. Introduction to Exceptional Children. Survey course in special education covering the educational, psychological, medical, and social aspects of exceptional children. Field experiences including emotionally disturbed, mentally retarded, neurologically impaired, physically handicapped, crippling and special health conditions, socially and culturally deprived and gifted children. (Opportunities for attendance at psychiatric, psychological, and educational demonstrations with exceptional children.) 3 units. (Also listed as Education 249.) *Lecturer Stedman*

251. Personality and Person Perception. A review, analysis, and perspective of research and theory relevant to individual differences in attribution of psychological characteristics to other people. Discussion will highlight interactions among stimulus, situational, and personality variables. Special topics will include accuracy and differentiation in person perception, implicit personality theories, and the concept of projection. 3 units. Prerequisite: Permission of instructor. *Associate Professor Altrocchi*

253, 254. Personality Development. A survey of behaviors and concepts relating to personality functioning through the life span from infancy to old age. Laboratory sessions will involve the study of individuals in natural and experimental contexts by observation and testing. 3 units each semester. *Lecturer Eisdorfer and Associate Professor Borstelmann*

271 a-d. Seminar in Selected Problems. 3 units each.

273. Principles of Psychological Measurement. Psychological measure-

ment will be discussed in the context of the theoretical questions which motivate research, and the related demands of scientific inference. Topics will include methods of psychometric scaling and test construction as well as selected methods for data analysis. Prerequisite: Mathematics 232 or equivalent. 3 units. *Assistant Professor Schiffman*

282. *Introduction to Methods in Psychotherapy.* Current trends in psychotherapeutic practice and research are discussed, as a means of introducing the student to the field. Emphasis is upon the application of principles drawn from theories of personality to individual and group psychotherapy. Discussions of selected readings and some field experience in therapy are included. 3 units. *Associate Professors Lakin and Carson*

292. *The History of Psychology.* 3 units. *Professor Adams*

For Graduates

305. *Psychopathology.* An examination of behavior disorders, with particular emphasis on explanatory concepts and the evidence from research in this field. 3 units. *Lecturer Cohen*

306. *Seminar in Developmental Psychology.* Readings in Piaget, Lewin, McDougall, Adler and Freud in an effort to synthesize their insights into a coherent theory of personality structure and of the changes constituting development. 3 units. *Professor Adams*

309. *Seminar in Learning.* 3 units. *Professor Kimble*

310. *Seminar in Perception.* 3 units. *Assistant Professor Lockhead*

311. *Seminar in Instrumental Behavior.* 3 units. *Professor Guttman*

313. *Seminar on Concept of the Reflex.* A consideration of the reflexological principles found in the works of Sherrington, Sechenov, Pavlov, Eccles, Skinner, Knorski, *et al.*, and an examination of the critiques of Goldstein, Lashley and others. Permission of instructors. 3 units. *Professors Diamond and Guttman*

316. *Seminar in Social Psychology.* 3 units. *Professor Jones*

318. *Seminar in Social Influence.* 3 units. *Professor Brehm*

320. *Seminar in Community Mental Health.* A study of psychological epidemiology and ecology; primary, secondary, and tertiary prevention; and the public health approach to problems of psychological disorders and psychological well-being. Focus on intervention techniques, such as consultation and community action planning. Prerequisite: Second year graduate level or permission of instructor. 3 units. *Associate Professor Altrocchi*

324. *Seminar: Behavioral Studies of the Brain.* 3 units. *Professor Diamond and Associate Professor Erickson*

335-336. *Clinical Psychology Practicum.* Seminar discussion and supervised field experience in the application of basic psychological procedures and principles to clinical cases in a variety of institutional settings. Prerequisite: Psychology 245, 246, 247, and 248. 1 to 6 units each of two semesters. *Staff*

337. Seminar in Afferent Neural Processes. A study of the neural bases of discrimination. 3 units. *Associate Professor Erickson*

341. Principles of Psychotherapy, I. Contributions from psychoanalysis, psychology, and social sciences will be reviewed to formulate a unified framework for understanding and treatment of behavior disorders. Emphasis on the problems characteristic of man living in society and culture and on principles of psychotherapy required by the human needs for consistency, self-esteem and self-realization. Selected case material will be used. Prerequisite: Psychology 282. 3 units. *Professor Dai*

342. Principles of Psychotherapy, II. Application of principles of psychotherapy in a detailed examination of interviews conducted by students. Emphasis on the role of the therapist's personality in the therapy process and on problems of technique. Prerequisite: Psychology 341. 3 units. *Professor Dai*

343, 344. Advanced Seminar in Clinical Psychology. 1 to 3 units each semester. *Staff*

371. Pre-School Behavior Problems. The diagnostic evaluation of behavior development in infants and preschool children. The nature and causation of developmental anomalies. (Physical handicaps and social conditions in relation to intellectual and personality development.) Preventive and remedial measures. 3 units. *Associate Professor Banham*

Religion

Professor Beach, *Director of Graduate Studies* (209 Divinity School); Professors Anderson, Clark, Cushman, Henry, Lacy, Petry, Price, Stinespring; Associate Professors Baker, Grislis, Herzog, Hillerbrand, Langford, Osborn, Poteat, Smith, Sullivan; Assistant Professors Langford, Robinson, Strugnell; Lecturer Wintermute

The Department of Religion offers graduate work leading to the A.M. and Ph.D. degrees. Students may major in one of three fields: (1) Biblical Studies; (2) Historical Studies; and (3) Systematic and Contemporary Studies. They will be expected to take such courses in one or both of the other fields as will conduce to an adequate understanding of their chosen fields of specialization.

In addition to course work in these major fields, students will take such other courses in cognate fields as will contribute to the enrichment of their major studies.

This minor requirement may be fulfilled either by work in a cognate department, such as Classical Studies, History, or Political Science, or by work in a cognate field within the Department of Religion other than the field of major concentration.

The program of doctoral studies presumes a grounding in religion such as is normally derived from the course content of theoretical subjects of

a seminary curriculum. Candidates for admission to the doctoral program are favored, therefore, who hold a B.D. degree from an accredited seminary or who have had at least two years of seminary study beyond the B.A. degree. Students applying for graduate work in religion directly from an undergraduate program should have had a strong undergraduate major in religion, and will be accepted for the Ph.D. program only on the condition of satisfactory completion of the M.A. degree with the department.

Candidates for the Ph.D. degree must complete the language requirements in both French and German not later than the beginning of the second year of residence.

Field I. Biblical Studies

201-202. First Hebrew. The principles and structure of the Hebrew language with translation of selected Old Testament narratives. 6 units. *Professor Stinespring*

207. Second Hebrew. Historical Hebrew grammar with reading and exegesis of Old Testament prose (the Pentateuch and historical books in alternate years). First semester. 3 units. *Staff*

208. Second Hebrew. Historical Hebrew grammar with reading and exegesis of Old Testament poetry (the Prophets and the Writings in alternate years). Second semester. 3 units. *Staff*

209. Biblical Theology. A study of the Old and New Testaments in regard to their theological relationship. 3 units. *Professor Anderson*

226. Exegesis of the Greek New Testament I. A. Mark and Matthew; B. Romans; C. Colossians and Ephesians. (N.T. 226 A, N.T. 226 B, and N.T. 226 C are separate courses, offered in different semesters.) 3 units. *Professor Price or Associate Professor Smith*

227. Exegesis of the Greek New Testament II. A. Luke-Acts; B. Galatians and I Corinthians; C. The Pastoral Epistles; D. The Apocalypse. (N.T. 227 A, N.T. 227 B, N.T. 227 C, N.T. 227 D are separate courses, offered in different semesters.) 3 units. *Professor Anderson or Associate Professor Smith*

228. The Theology of the Gospel and Epistles of John. A study of the origin of these writings; the provenance of their thought forms and symbolism; their influence on the early church; and contemporary significance. 3 units. *Professor Price*

301. The Theology of the Dead Sea Scrolls. A study of the religious ideas of the Scrolls in relation to the theology of the Old and New Testaments. 3 units. *Assistant Professor Strugnell*

302. Studies in the Intertestamental Literature. Selected documents of the Apocrypha and Pseudepigrapha examined exegetically and theologically in their relation to Post-Exilic Judaism. Prerequisite: Permission of the instructor. 3 units. *Professor Anderson*

304. Aramaic. A study of the Aramaic portions of the Old Testament, and selected passages from the Targums, Midrashes, and Talmuds. 3 units. *Professor Stinespring or Assistant Professor Strugnell*

305. Third Hebrew. An interpretative study of late Hebrew prose, with readings from Chronicles, Ecclesiastes, and the Mishnah. 3 units. *Professor Stinespring*

306. Language and Literature of the Dead Sea Scrolls. A study in interpretation. Prerequisite, a knowledge of Hebrew. 3 units. *Assistant Professor Strugnell*

307. Syriac. A study of the script and grammar, with readings from the Syriac New Testament and other early Christian documents. Some knowledge of Hebrew and Aramaic prerequisite. 3 units. *Professor Stinespring*

309. History of the Ancient Near East. A specialized study of the civilizations of Egypt, Palestine, Syria, and Mesopotamia in the light of Biblical archaeology. 3 units. *Professor Stinespring*

310. Old Testament Prophecy. The prophetic movement in Israel with special emphasis on the theological standpoint of the prophets of the eighth century B.C. 3 units. *Professor Stinespring*

318. Textual Criticism of the New Testament. A study of the scientific recovery of the Greek text on which modern versions are based; manuscript discoveries; principles of textual criticism; practice in collating original manuscripts in the Duke collection. 3 units. *Professor Clark*

340-341. Seminar in the New Testament. Research and discussion on a selected problem in the Biblical field. 2 or 3 units. *Professors Anderson, Price, or Associate Professor Smith*

Field II. Historical Studies

234. The Theology of Thomas Aquinas. A systematic interpretation of the thought of Aquinas, with a major emphasis on his specifically theological formulations, drawing upon the *Summa Theologica* and other relevant sources. 3 units. *Associate Professor Grislis*

240. The Theology of Richard Hooker. An exposition of the writings of the systematic theologian of Anglicanism in the sixteenth century. 3 units. *Associate Professor Grislis*

250. The Reformation of the 16th Century. History and Thought of European Christianity between 1517-1555. (Listed also as History 225.) 3 units. *Associate Professor Hillerbrand*

252. Pietism, Deism, and Rationalism. History and thought of European Christianity between 1650-1800. 3 units. *Associate Professor Hillerbrand*

260. Seminar: Wesley Studies. The lives and thought of John and Charles Wesley and their colleagues in relation to English culture and religion in the 18th century. 3 units. *Associate Professor Baker*

279. *Religions of East Asia.* A study of the major traditions of China and Japan with emphasis on the development and expansion of Buddhism. 3 units. *Associate Professor Sullivan*

280. *The History of Religions.* A study of the methodology of the history of religions, the nature of religious experience, and specific categories of religious phenomena. 3 units. *Associate Professor Sullivan*

285. *Origins of Indian Civilization.* A study of the main sources and traditions of the classical civilization of the Indian sub-continent, with particular attention to religious movements and institutions. (Also listed as History 285.) 3 units. *Associate Professor Sullivan*

296. *Religion on the American Frontier.* A study of the spread of evangelical Christianity as a theological and cultural phenomenon of the American West. 3 units. *Professor Henry*

322. *Nineteenth-Century European Theology.* Protestant theology from Kant to Herrman. 3 units. *Associate Professor Herzog*

331. *The Social Message of the Early and Medieval Church.* A study of the social teachings and contributions of the Christian Church prior to the Protestant Reformation. 3 units. (Not 1966-67) *Professor Petry*

332. *The Medieval Church.* Outstanding characteristics of the Medieval Church, emphasizing theory, polity, institutions, sacraments, and worship. 3 units. *Professor Petry*

334. *Church Reformers and Christian Unity.* The work of such reformers as Marsilius of Padua, William of Ockham, Jean Gerson, Pierre d'Ailly, and Nicholas of Cusa in relation to ecclesiastical schism and the search for Christian unity through representative councils. 3 units. (Not 1966-67) *Professor Petry*

336. *Christian Mysticism in the Middle Ages.* Source studies in historical perspective of such late medieval mystics as Bernard of Clairvaux, the Victorines, Ramon Lull, Meister Eckhart, Richard Rolle, Catherine of Siena, and Nicholas of Cusa. 3 units. *Professor Petry*

337. *The Theology of Martin Luther.* A critical and comparative examination of Luther's thought. 3 units. *Associate Professor Hillerbrand*

338. *The Theology of John Calvin.* An exposition of the *Institutes of the Christian Religion* in relation to cognate documents. 3 units. *Associate Professor Grislis*

339. *Left-Wing Movements of the Reformation.* A survey of the history and theology of the "radical" Reformation. 3 units. *Associate Professor Hillerbrand*

387. *Christian Ethics and Social Philosophy.* Selected social philosophies from Locke to Sumner analyzed from the standpoint of Christian ethics. 3 units. (Not 1966-67) *Professor Lacy*

391. *Historical Types of Christian Ethics I.* A critical study of representative statements of Christian ethical theory, through the early Reformation. 3 units. (Not 1966-67) *Professor Beach*

392. *Historical Types of Christian Ethics II.* A continuation of C.E. 391, from the Reformation through current Christian ethical theory. Prerequisite: C.E. 391. 3 units. (Not 1966-67) *Professor Beach*

395. *Christian Thought in Colonial America.* Exposition of the main currents in Protestant theology. 3 units. *Professor Henry*

396. *Liberal Traditions in American Theology.* A study of the main types of modern religious thought, beginning with the theology of the Enlightenment. 3 units. *Professor Henry*

Field III. Systematic and Contemporary Studies

210. *British Theology.* A study of twentieth-century British Theology. Attention will be given to the Anglican, Free Church, and Scottish traditions. 3 units. *Assistant Professor Langford*

230. *The Meaning of Religious Language.* An analysis of the credentials of some typical claims of theism in the light of theories of meaning in recent thought. 3 units. (Also listed as Philosophy 230.) *Associate Professor Poteat*

231. *Seminar in Christianity and Contemporary Thought.* Analytical reading and discussion of such critical cultural analysis as is found in the works of M. Polanyi, Arendt, Trilling, and others, with appraisal of the relevance for theological inquiry. 3 units. *Associate Professor Poteat*

248. *The Theology of Karl Barth.* An historical and critical study of the theology of Karl Barth. 3 units. *Associate Professor Osborn*

292. *Christian Ethics and International Relations.* An examination of Christian attitudes toward such issues as war and peace, the rule of law, foreign aid, and human rights; and the Church's contribution to international policies and institutions. 3 units. *Professor Lacy*

303. *The New Hermeneutic and the Concept of History.* A critical examination of key issues in present-day European systematic theology centered in the positions of Fuchs, Ebeling, Moltmann, Ott, and Pannenberg. 3 units. *Associate Professor Herzog*

320. *Seminar: Schleiermacher.* A critical examination of the dogmatic system. 3 units. *Associate Professor Herzog*

325. *Philosophical Theology I.* Main problems in the history of philosophical theology from the pre-Socratics to Descartes. 3 units. *Assistant Professor Robinson or Professor Cushman*

326. *Philosophical Theology II.* Main problems of philosophical theology in the modern period. 3 units. *Assistant Professor Robinson or Professor Cushman*

328. *Twentieth-Century European Theology.* Critical examination of the thought of selected representative theologians. 3 units. *Associate Professor Herzog*

333. *Seminar: Marxist Ideology and Christian Faith.* Comparative

study of Communist and Christian doctrines of man, society, sin, history, ethics, and eschatology. 3 units. *Professor Lacy*

380. *Existentialist Thought*. An exploration of the interests and motifs of Existentialism in relation to modern philosophy and theology through an analysis of representative writings of Kierkegaard, Heidegger, Berdyaev, Marcel, and Sartre. 3 units. *Associate Professor Poteat*

385. *Religion in American Literature*. A critical study of the meaning and value of religious motifs reflected in American literature. 3 units. *Professor Henry*

386. *Seminar: Theological Trends in the World Church*. Contemporary currents of Christian thoughts as they affect resurgent non-Christian faiths, new formulations of a theology of mission, and ecumenical conversations. 3 units. *Professor Lacy*

389. *Christian Ethics and Contemporary Culture*. A study of the interaction between Christian thought and current secular social theory. 3 units. *Professor Beach*

390. *Current Problems in Christian Ethical Theory*. A critical study of dominant issues in Christian ethics, through an analysis of a variety of contemporary Christian treatments of such problems as love, justice, community, and vocation. 3 units. (Not 1966-67) *Professor Beach*

394. *Christianity and the State*. The relation of the Christian theory of the State to political problems, with special consideration of the religious assumptions underlying democratic theory and practice and of the relationship of church to state. 3 units. *Professor Beach*

397. *Contemporary American Theology*. Critical appraisal of major tendencies. 3 units. *Professor Henry*

398. *Colloquium on the College and University Teaching of Religion*. The theological issues of religion in higher education; a consideration of the curricular content of religion courses. Normally expected of Level III students in Fields I, II, and III in residence. *Professor Beach and Staff*

Romance Languages

Professor Fein, *Chairman* (205 Foreign Lang.); Associate Professor Cordle, *Director of Graduate Studies* (303 Foreign Lang.); Professors Castellano, Cherpack, Davis, Dow, Fowlie, Predmore, and Wardropper; Associate Professors Bush, Grant, Tetel, and Vincent; Assistant Professor Hull

The Department of Romance Languages offers graduate work leading to the A.M. and Ph.D. degrees. In order to undertake graduate study in this Department, the student should normally have credit for four years of college courses in the chosen language, or 18 semester hours beyond the conventional two units offered at entrance to college. In addition to this minimum requirement, the student should have had one semester of

review in composition and grammar.

It is recommended that candidates for the A.M. degree take a second Romance language as the minor subject.

A candidate for the Ph.D. degree will be required to take some training in Romance linguistics, the amount to be determined by the Department upon consideration of the student's preparation in the field, and a course in the methods of literary scholarship.

French

209. *Advanced Composition and Syntax.* A detailed study of the morphological and syntactic structure of the French language; practice in writing various styles of French; vocabulary study. 3 units. *Assistant Professor Hull*

210. *French Phonetics.* The phonemic structure of contemporary French. Sounds, intonation. Practice transcription. Remedial pronunciation drills. Readings on current phonological theory, especially as applied to French. 3 units. *Assistant Professor Hull*

213. *French Literature of the Seventeenth Century.* Its initial phase. Readings in the major literary works to the middle of the century. 3 units. (Not 1966-67) *Professor Cherpack*

214. *French Literature of the Seventeenth Century.* Its "classical" phase. Readings in the major literary works from the middle to the end of the century. 3 units. (1966-67) *Professor Cherpack*

217. *Mallarmé and Rimbaud.* The symbolism and the formal elements in Mallarmé's poetry. The poetic theory and the psychic elements in Rimbaud's poetry. 3 units. (Not 1966-67) *Professor Fowlie*

219. *Old French Literature.* An introduction to the reading of Old French literary texts. 3 units. (Not 1966-67) *Associate Professor Vincent*

221. *The Nineteenth-Century French Novel.* Its initial phase. The Romantic hero in conflict with society, with special emphasis on the works of Stendhal and Balzac. 3 units. (1966-67) *Associate Professor Grant*

222. *The Nineteenth-Century French Novel.* Its continuation. The decline of the individual hero. Flaubert and Zola will receive intensive study. 3 units. (Not 1966-67) *Associate Professor Grant*

223. *French Literary Criticism.* A history of critical theory in France and a study of the major critics from the Renaissance to today. 3 units. (Not 1966-67) *Professor Fowlie*

225, 226. *From Renaissance to Baroque in French Literature of the Sixteenth Century.* First semester: Literary prose. Readings from Jean Lemaire de Belges, Marguerite de Navarre, Rabelais, Montaigne, and others. Second semester: Poetry and theater. Readings from Marot, Sceve, Labé, Saint Gelais, the Pléiade, d'Aubigné, Sponde, Du Bartas, Garnier, and others. (Not 1966-67) *Associate Professor Tetel*

228. French Poetry of the Twentieth Century. In the wake of symbolism: Valéry and Claudel; poetry as ritual; Péguy; Apollinaire and surrealist poetry; the contemporary movement: Michaux, Char, Saint-John Perse. 3 units. (Not 1966-67) *Professor Fowlie*

229. The Limits of Romanticism. A critical study of the end of an epoch as shown in the works of Barbey d'Aurevilly, Villiers de l'Isle-Adam and Huysmans. 3 units. (1966-67) *Associate Professor Bush*

233. Contemporary French Theater. A study of dramatic theory; the art of the leading directors; and the major texts of Claudel, Giraudoux, Anouilh, Sartre, Beckett, Ionesco, Genet, etc. 3 units. (Not 1966-67) *Professor Fowlie*

234. Proust. A study of *A la recherche du temps perdu*. The thematic structure and the aesthetics of the work. 3 units. (1966-67) *Professor Fowlie*

236. Baudelaire. A study of the poetry and the criticism of Baudelaire as contributing to the origins of modern art and literature. 3 units. (Not 1966-67) *Professor Fowlie*

241, 242. French Literature and Thought in the Age of Enlightenment. First semester: The new philosophy and its propagation. Lectures and discussions involving texts by Fontenelle, Montesquieu, Voltaire, Rousseau, Diderot, and others. Second semester: The crisis in literary aesthetics. Readings, lectures, and discussions bearing on the clash between Classicism and new literary orientations. 6 units. (1966-67) *Professor Cherpach*

245. French Literature of the Twentieth Century. To 1935. Emphasis on Gide, Mauriac, and Malraux. 3 units. (Not 1966-67) *Associate Professor Cordle*

246. French Literature of the Twentieth Century. After 1935. Emphasis on Sartre, Camus, and the *nouveau roman*. 3 units. (1966-67) *Associate Professor Cordle*

248. French Literature of the Twentieth Century: Three Modern Prophets. Extensive reading from Bloy, Péguy, Bernanos. 3 units. (Not 1966-67) *Associate Professor Bush*

For Graduates

311, 312: French Seminar. Each semester one of the following topics will be selected for intensive treatment: (a) Studies in Sixteenth-Century Literature, (b) Studies in Eighteenth-Century Literature, (c) Studies in Nineteenth-Century Literature, (d) Studies in Seventeenth-Century French Literature, (e) Studies in Contemporary Literature. 3 units each semester. *Professors Cherpach and Fowlie; Associate Professors Bush, Cordle, Grant, and Tetel*

— **Graduate Reading Course.** An intensive course in French to develop rapidly the ability to read French in several fields. Graduate students only. No credit.

Italian

For Seniors and Graduates

288. *The Renaissance*. Petrarch, Boccaccio, and Ariosto. 3 units. Associate Professor Tetel

Spanish

For Seniors and Graduates

251. *The Origins of the Spanish Novel*. A critical study, based on close readings and discussions, of selected examples of the principal genres of the early novel: the *Amadis de Gaula*, Diego de San Pedro's *La cárcel de amor*, the *Abencerraje*, the *Lazarillo*, Montemayor's *Diana*. 3 units. (Not 1966-67) Professor Wardropper

252. *Spanish Lyric Poetry Before 1700*. A critical study, based on close reading and discussion, of selected poems of the Middle Ages, Renaissance and Baroque. Special emphasis on the *Razón de amor*, *la poesía de tipo tradicional*, and Santillana; on Garcilaso, San Juan de la Cruz, Fray Luis de León, and Herrera; on Góngora and Quevedo. 3 units. (Not 1966-67) Professor Wardropper

253. *The Origins of the Spanish Theater*. A study of the evolution of the Spanish theater from the *Auto de los Reyes Magos* (12th century) through the end of the 16th century. The idea of the theater as dramatic poetry will be stressed; close reading of texts by Gómez Manrique, Encina, Gil Vicente, Torres Naharro, Lope de Rueda, Juan de la Cueva. 3 units. (Not 1966-67) Professor Wardropper

255. *Modern Latin-American Literature*. The coming of age of Latin-American literature in the nineteenth and twentieth centuries, with particular attention to the Modernist movement. 3 units. (Not 1966-67) Professor Fein

256. *Contemporary Latin-American Literature*. Trends in Latin-American literature after the Modernist movement. Analysis of significant works in various genres. 3 units. (1966-67) Professor Fein

258. *Old Spanish Literature*. An introduction to the reading of Old Spanish literary texts. 3 units. (Not 1966-67) Professor Davis

259. *Spanish Phonetics*. A phonemic approach to the study of Spanish sounds. Remedial pronunciation drills with special emphasis on rhythm and intonation. Readings in current studies of phonology. 3 units. Professor Castellano

260. *Advanced Composition and Syntax*. Study of fundamental difficulties in the language; practice in writing idiomatic Spanish; exercises in free composition. For students who have a satisfactory command of Spanish grammar and fair conversational ability. 3 units. Professor Castellano

261. *Nineteenth-Century Novel.* A study of literary trends in the last half of the nineteenth century. Readings will be selected from the novels of Valera, Pereda, Galdós, Pardo, Barzán, Blasco Ibáñez, and their contemporaries. 3 units. (1966-67) *Professor Davis*

264. *Modern and Contemporary Spanish Theater.* A brief review of modern and contemporary Spanish theater from the period of Romanticism. Lectures, reading and discussion of the most representative works of Benavente, los hermanos Quintero, García Lorca, Casona, etc. 3 units. (Not 1966-67) *Professor Castellano*

265. *Golden Age Literature: Cervantes.* The life and works of Cervantes with special emphasis on his *Quijote*. 3 units. (1966-67) *Professor Predmore*

266. *Golden Age Literature: The Drama.* Study of the chief Spanish dramatists of the seventeenth century with readings of representative plays of this period. 3 units. (1966-67) *Professor Castellano*

275. *Contemporary Spanish Literature.* The essay and lyric poetry. A study of the revision of national values and literary expression in the twentieth century with particular reference to the crisis of 1898 and to the enrichment of the Spanish tradition through extra-peninsular influences. 3 units. (1966-67) *Professor Predmore*

276. *Contemporary Spanish Literature.* The novel. A study of tradition and innovation in the twentieth-century Spanish novel with emphasis on the novels of Unamuno, Baroja, Valle Inclán, and Pérez de Ayala. 3 units. (1966-67) *Professor Predmore*

For Graduates

321, 322. *Hispanic Seminar.* Each semester one of the following topics will be selected for intensive treatment: (a) The Spanish Language in America, (b) Studies in Medieval Literature, (c) Studies in the Literature of the Golden Age, (d) Studies in Latin American Literature, (e) Studies in the Spanish Renaissance and Baroque, (f) Studies in Spanish Poetry, (g) Studies in Nineteenth-Century Spanish Literature. 3 units each semester. *Professors Castellano, Davis, Fein, Predmore, and War-dropper*

Romance Languages

211. *Approaches to Romance Literature.* An introduction to the most significant ways in which Romance literature has been divided and studied, with analyses of selected texts. 3 units. *Professor Cherpack*

218. *The Teaching of Romance Languages.* Evaluation of objectives and methods; a study of the practical problems involved in teaching these languages on the elementary, secondary, and college levels; analysis of textbooks, special foreign language programs, audio-visual aids; critical

examination of modern techniques in written and oral testing. 3 units.
Professor Dow

224. Romance Linguistics. The origin and development of the Romance languages from spoken Latin to the modern standard languages and local dialects. Introduction to contemporary methods in historical and comparative linguistics. 3 units. *Assistant Professor Hull*

Russian

Associate Professor Jezierski

No graduate degree is presently offered in Russian. The following courses may serve in the minor programs of students in other departments.

201, 202. The Novelists of Nineteenth-Century Russia. Development of the Russian novel against the European background, with emphasis on Dostoevskij and Tolstoj. Extensive readings in English. Lectures, oral reports, class discussions, and term paper. 6 units. *Associate Professor Jezierski*

Sociology and Anthropology

Professor McKinney, *Chairman* (268 Sociology-Psychology Building); Professor Maddox, *Director of Graduate Studies* (336 Sociology-Psychology Building); Professors Back, Kerckhoff, La Barre, and Thompson; Associate Professors Beidelman, McCormack, Marsh, Preiss, Rowe, Roy, Smith, Tiryakian, and Winsborough; Assistant Professor Farley; Lecturer Apte

The Department offers graduate work leading to the A.M. and Ph.D. degrees in Sociology and in Anthropology. Before undertaking advanced work in this department, a student must have completed a minimum of twelve semester hours of approved preliminary courses in his chosen discipline, and twelve additional semester hours in the field or in related work. Applicants for admission should submit scores on the Graduate Record Examination, especially the Aptitude Test.

Before being admitted to candidacy for the Ph.D. degree in Sociology, an applicant is normally expected to have qualified for the A.M. degree. Candidates for the Ph.D. degree are expected to demonstrate in qualifying and preliminary examinations a broad background in the various aspects of sociology—substantive, theoretical, and empirical. The program of each candidate is determined by a committee which reviews his previous work and sets the specific requirements to be met. These requirements will include work in related fields such as anthropology,

economics, mathematics, philosophy, political science, or psychology. Emphasis is placed on the completion of the dissertation, directed by a member of the staff, demonstrating competence and independence in the investigation of an original and significant problem.

Before being admitted to candidacy for the Ph.D. degree in Anthropology, an applicant is normally expected to have qualified for the A.M. degree. Candidates for the Ph.D. degree must show evidence by preliminary or qualifying examination a command of a major field within the discipline. The Department recognizes the trend in modern Anthropology toward interdisciplinary research and part of the Anthropology course requirements may be replaced by advanced work in anatomy, economics, sociology, zoology, and other disciplines relevant to the student's program.

Further details of these programs, the departmental facilities, the staff, and various stipends available are described in a brochure which may be obtained from the Director of Graduate Studies, Department of Sociology and Anthropology.

Sociology

For Seniors and Graduates

241. Social Stratification. The nature of hierarchical and vertical differentiation in the economic, political and prestige structures in modern societies. The interrelationship of class, status and power strata and their influence on social institutions, personality structure, and group and individual behavior. 3 units. *Associate Professors Marsh and Roy*

242. The Sociology of Occupations and Professions. The social significance of work. Analysis of forces changing the contemporary occupational structure, typical career patterns of professions and occupations, the social organization of occupational groups. 3 units. *Professor McKinney and Associate Professor Roy*

243. Population Dynamics and Social Change. The aim of this course is to introduce the student to the facts and techniques of demographic analysis, and to provide an understanding of the relationship between the demographic structure of society and its social organization. 3 units. *Associate Professor Winsborough*

247. Community and Society. This course seeks to provide a frame of reference for the analysis and ordering of facts pertaining to the diverse cultures of the world, the State, the world community, the Great Society, news, mass behavior, social problems, races and classes. 3 units. *Professor Thompson*

251. The Sociology of Modernization. Changes, obstacles to change, and structural strains which occur in kinship, stratification, bureaucracy and the role of the military, occupations and work, communications, values and ideologies, during modernization. Special reference to Asian societies. 3 units. *Associate Professor Marsh*

253. *Social Institutions.* The study of particular institutions and the social movements out of which they developed, with emphasis on the development of general propositions concerning the nature, function and importance of institutions in society. 3 units. *Professor Thompson*

255. *Race and Culture.* A comparative study of race relations in world perspective developed around such themes as races and personal identity, the geography and ecology of race relations, the idea of race, and race conflict. 3 units. *Professor Thompson*

259. *Religion and Social Change.* A study of the role of religion in significant social changes in Western and non-Western societies. Emphasis given to non-institutional phenomena (charisma, prophecy, messianism, revivals, glossolalia). Prerequisite: either Anthropology 264, Sociology 151, or the equivalent. 3 units. *Associate Professor Tiryakian*

272. *The Socialization Process.* A consideration of the universal societal requirement for replacement of socialized personnel with major concentration on the process in Western society. Particular attention is given to variations in socialization by position in the social structure (class, caste, urban-rural, etc.) and to the contributions made by various socialization agencies (family, school, peer groups, mass media). 3 units. *Professor Kerckhoff*

275. *Social Attitudes and Individual Behavior.* Such issues as the following are considered: the importance of symbolic interaction, the development of the "self," the social structuring of the socialization process, individual movement within the social structure, and the importance of membership groups and reference groups. 3 units. *Professor Back and Kerckhoff*

278. *Social Structure and the Life Cycle.* A study of the relationship between age as a social characteristic and social interaction, with particular reference to adolescence and old age. 3 units. *Professor Maddox*

282. *Principles of Sociological Analysis.* An advanced course in general sociology designed to give a systematic conception of social order, focusing on its structural components and the functions they serve. Undergraduates must have at least 15 s.h. and a B average in sociology and have the permission of the instructor. 3 units. *Professor Thompson*

295. *Methodology in Sociology.* Considerations of the nature of scientific method, as well as alternative paths to knowledge, as they apply to sociology. Conceptualization, hypothesis formation, and definition. The research process as a decision-making situation both on the general level of research design and the specific level of special techniques. The process and logic of data analysis. Relations of theory and research are stressed. 3 units. *Professor Back and Associate Professor Smith*

297. *Statistical Analysis in Sociology.* Such techniques as zero and higher order linear and curvilinear correlation, partial correlation, analysis of variance and covariance and factorial design are studied. Where possible, analogous non-parametric techniques are also considered. Pre-

requisite: Mathematics 233 or an equivalent course or permission of the instructor. 3 units. *Associate Professor Winsborough and Assistant Professor Farley*

For Graduates

341. *Special Problems of Complex Systems.*

(a) *Industrial and Professional Systems.* Analysis of problems of organization of work in such diverse settings as industrial plants, hospitals, and public administration groups. Problems of decision-making, recruitment, allocation of authority, informal organization, interorganizational relations. 3 units. *Professor McKinney and Associate Professor Roy*

(b) *Mass Communications.* Theoretical problems in defining and distinguishing communication, communicative acts, communication processes, and communication systems. Work aimed toward the derivation of models and theories for each of these will be pursued. Students must have permission of the instructor. 3 units. *Associate Professor Smith*

(c) *Urban Society.* Analysis is made of the varying mechanisms through which urban society is integrated, how urbanites develop a sense of identification with the community, and the extent and mode of social dominance of the city in the larger society. 3 units. *Professor Thompson and Associate Professor Smith*

(d) *Human Ecology.* An examination of such issues as: the logic and utility of the ecological approach; the possibility of testing current ecological theories in non-western, non-urban environment; alternative explanations for the spatial patterning of social phenomena; selected methodological problems. 3 units. *Professor Thompson and Associate Professors Smith and Winsborough*

351, 352. *Seminar in Social Organization.* Examination of such problems as the bases of social cohesion and continuity, the sources and effectiveness of social control mechanisms, the problem of social change in structural-functional theory. 3 units each semester. *Professor Maddox, McKinney, and Thompson*

361. *Seminar in Comparative Sociology.* Student research projects on some aspects of cross-societal comparative analysis. Major emphasis on the relevance of evolutionary, functional, and structural theories for explaining the findings of comparative studies. 3 units. *Associate Professor Marsh*

373, 374. *Social Psychological Issues in Sociology.* Detailed exploration of selected problem areas such as the theory and measurement of social attitudes, role discontinuity and personality disorders, applications of reference group theory, the socialization process. 3 units each semester. *Professors Back and Kerckhoff and Associate Professor Preiss*

381. *Development of Sociological Theory.* An analysis of the development, convergence and utilization of sociological theory. 3 units. *Professor McKinney and Associate Professors Marsh and Tiryakian*

385, 386. Seminar in Sociological Theory. Detailed analysis of methodological and substantive problems in utilizing comprehensive, middle-range, and discrete theories in varied sociological areas. Major emphasis on the use of theory in empirical research. Open to students who have had Sociology 381 or its equivalent. 3 units each semester. *Professor McKinney and Associate Professors Marsh and Tiryakian*

392. Individual Research in Sociology. Students will conduct on an individual basis research designed to evaluate a sociological hypothesis of their choice. The process must be completed by preparation of a report on this research in adequate professional style. Prerequisite: Sociology 295 or permission of the instructor. 3 units. *Professors Back and Kerckhoff and Associate Professor Smith*

397, 398. Seminar in Special Research Problems. Treatment in depth of either selected methodological issues and/or methods. Examples of possible topics include scaling, methods of machine data processing, validation and induction, quantification, interviewing, measurement, sampling plans, development of research designs from statistical models, methodological research, experimental techniques, the relation of theory to research, and the role of statistical methods in sociology. Open to students by permission of the instructor. 3 units each semester. *Professor Back and Associate Professors Smith and Winsborough*

Anthropology

For Seniors and Graduates

220. Society and Culture in India. The basic features of Indian cultures and societies from an anthropological perspective. The impact of selected technological and social changes upon the individual, caste, and community. 3 units. *Associate Professors Rowe and McCormack*

222. Topics in African Anthropology. Current research problems in African anthropology, as illustrated by an intensive and continuing study of a tribal society. Interpretation of the results of field research in terms of contemporary theories about culture and society. 3 units. *Associate Professor Beidelman*

231. Physical Anthropology. A survey of the major developments of physical anthropology. Human evolution, primate phylogeny, paleontology of man and other primates, primate biochemical genetics, primate behavior, human variation (genetic and somatic) are the principal topics of the course. (Also listed as Anatomy M231.) 3 units. *Associate Professor Buettner-Janusch*

238. Language and Society. An introduction to the study of language and society. Universal features of language, language as a mirror of society and social perception through language, language as a coding

system, linguistics and anthropology, applied linguistics. 3 units. *Associate Professor McCormack and Lecturer Apte*

246. *Personality and Culture.* The influence of culture patterns and social institutions upon character structure, socialization of the individual, and the dynamics of human personality. Comprehensive anthropological materials will be drawn upon. 3 units. *Professor La Barre*

260. *Linguistic Anthropology: Phonemics.* Application of descriptive linguistics to analysis of language; concentration on the sound system of a South Asian language, and other non-Western languages. 3 units. *Lecturer Apte*

261. *Linguistic Anthropology: Morphology and Syntax.* Application of descriptive linguistics to analysis of language; concentration on the grammatical system of a South Asian language, and other non-Western languages. Prerequisite: Anthropology 260. 3 units. *Lecturer Apte*

262. *Anthropology of Law.* An introduction to the study of legal anthropology. Legal decision in preliterate societies. The interrelationships of law, ritual, and myth as viewed in recent studies of tribal societies. 3 units. *Associate Professor Beidelman*

263. *Primitive Art and Music.* A comparative ethnological study of the data and theories concerning non-European music and art; sufficient technical background will be provided for non-specialist students. Recordings, slides, and museum artifacts will be used. 3 units. *Professor La Barre*

264. *Primitive Religion.* The ethnography, the social functions, and the socio-psychological meanings of religion in primitive societies. 3 units. *Professor La Barre*

265. *Personality and Society.* The sociology and social psychology of human personality, its origins in the primary group, its nature and varieties and its integrations into secondary group institutions. 3 units. *Professor La Barre*

292. *Anthropological Theory.* An introduction to theoretical, methodological and comparative issues in anthropology. Emphasis on critical reading and review of monographs in social, cultural and psychological anthropology. 3 units. *Associate Professor Beidelman and Rowe*

For Graduates

330. *Seminar in Anthropology.* A seminar for advanced students who wish to pursue individual studies in social and cultural anthropology. Offered both semesters. 1 to 3 units each semester. *Professor La Barre and Associate Professors Beidelman, McCormack and Rowe*

393. *Individual Research in Anthropology.* A course for the student preparing the M.A. thesis or the Ph.D. dissertation. Supervision and guidance of intensive research or a problem approved by the enrollee's departmental advisory committee. 3 units. *Professor La Barre and Associate Professors Beidelman, McCormack and Rowe*

410. Seminar in the Government, History, and Social Structure of India and Pakistan. 3 units. Associate Professors McCormack, Rowe and Associates

Zoology

Professor Horn, *Chairman* (227 Biological Sciences Building); Associate Professor Livingstone, *Director of Graduate Studies* (042 Biological Sciences Building); Professors Bailey, Bookhout, Fluke, Gray, Gregg, Hughes-Schrader, Menzies, Schmidt-Nielsen, Wilbur; Adjunct Professor Stefansson; Associate Professors Buettner-Janusch, Costlow, Hunter, Klopfer, Nicklas, Vernberg, Wainwright, Ward; Assistant Professor Tucker

To undertake study toward an advanced degree in zoology, a student should have completed an undergraduate major in zoology or its equivalent. This normally amounts to 24 or more hours of course work distributed among various fields of zoology. The department recognizes the trend in modern biology towards interdisciplinary research and part of the zoology requirements may be replaced by advanced work in chemistry, mathematics, physics, etc.

Required work for the A.M. degree ordinarily includes 12 units of advanced course work in zoology, 6 units of course work in a minor department, and an additional 6 units of advanced work in the major or minor department, or in other pertinent departments. Furthermore, an acceptable thesis is necessary for the fulfillment of the degree requirements.

Candidates for the Ph.D. degree are expected to be broadly trained zoologists. The program of each candidate is determined by a committee which reviews previous training and sets the specific requirements to be made. Normally the program includes graduate courses in several fields of zoology, courses in the minor subject, wide reading in science in general and in biology in particular, research, and a dissertation based on original work. Minor work is available in many fields, including anatomy, biochemistry, botany, chemistry, geology, physics, physiology and psychology.

For Seniors and Graduates

201. Animal Behavior. A review of the major developments in the field with emphasis on recent physiological and developmental studies. Prerequisites: Physiology, Genetics and Evolution, or consent of instructor. 3 units; 4 units with laboratory. (Not 1966-67) Associate Professor Klopfer

203. Ecology. Relation of animals to environment. Lectures, reading,

reports, conferences; laboratory and field work. 4 units. (See also Marine Laboratory.) *Professor Gray*

210. *Experimental Genetics.* The relation of phenotype to genome and environment; cytogenetics, recent research in the field of genetics. Laboratory. Prerequisites; Principles of heredity (one of the following: Zoology 110, Botany 101, 202, or equivalent) or consent of instructor. 4 units. (1966-67) *Associate Professor Ward*

214. *Biological Oceanography.* Composition in time and space of marine biosphere in relation to descriptive marine chemistry, physics, and geology. Some work at sea aboard the research vessel. Prerequisites: A course in Invertebrate Zoology, Ecology, Marine Biology or an appropriate equivalent. Chemistry through organic. One year of Physics and Mathematics. 4 units. (*Given at Beaufort.*) *Professor Menzies*

215. *General Physical and Chemical Oceanography.* Relief of the ocean floor; physical and chemical properties of sea water; distribution of temperature, salinity, and density; heat budget; sea ice; light; ocean currents, waves and tides; selected topics of regional oceanography.—Field work, processing and analyzing of routine oceanographical data, solving problems and interpretation of results. Prerequisites: One year of physics and chemistry, mathematics through calculus. 6 semester hours. *Adjunct Professor Stefansson*

216. *Limnology.* The chemistry, physics and biology of lakes with special references to the interpretation of their sedimentary record. 3 units; 4 units with laboratory. (1966-67) *Associate Professor Livingstone*

222. *Entomology.* Anatomy, physiology, embryology, and classification of insects. Prerequisite: one year of zoology. 4 units.* *Professor Gray*

224. *Vertebrate Zoology.* A study of life histories, adaptations, ecology, and classification of vertebrate animals. Prerequisite: Zoology 53. 4 units. (Not 1966-67) *Associate Professor Bailey*

228. *Experimental Embryology.* Lectures, readings, reports, and laboratory work. 4 units. (Not 1966-67) *Professor Gregg*

238. *Systematic Zoology.* The fundamental theory and practice involved in the collection, identification, and classification of animals. Prerequisite: Zoology 1, 2. 4 units. (1966-67) *Associate Professor Bailey*

243. *Cytology.* The structural and functional organization of cells. Lectures, readings and laboratory work. Prerequisite: One year of biology. (Listed also as Botany 243.) 4 units. *Professor Anderson (Botany) and Associate Professor Nicklas*

244. *Topics in Cell Structure and Function.* Advanced discussions of selected problems such as chromosome structure, mitosis, and cytological aspects of inheritance and development. Prerequisite: Zoology 243 (Botany 243) or equivalent and permission of instructor. 2 units. (1965-66) *Associate Professor Moses (Anatomy) and Associate Professor Nicklas*

245. Radiation Biology. Actions of ionizing and excitational radiations on life processes: a survey and an adventure in biophysics. Prerequisites: college physics and mathematics, organic chemistry. 3 units, or 4 units with laboratory. (Not 1966-67) *Professor Fluke*

246. Molecular Biology. The nature, functional relationships and replication of biological structure of the molecular level. Laboratory projects optional by arrangement. Prerequisites: College physics, mathematics, and organic chemistry. Biochemical and genetic background are suggested. 3 units, or 4 with instructor's advanced approval of laboratory work. (Not 1966-67) *Professor Fluke*

247. Biological Nucleonics. Lecture and laboratory instruction in biological uses of radioactive tracers, in counting instruments and measurements, and in legal requirements. Prerequisites: Consent of the instructor and one year each of college biology, chemistry, and physics. 3 units. (1966-67) *Professor Fluke*

250. Physiological Ecology of Marine Animals. A study of the physiological responses of marine animals in relation to certain environmental factors and evolution. Animals representing numerous phyla from various habitats are studied. Prerequisite: A course in physiology. 6 units. (Given at Beaufort.) *Associate Professor Vernberg*

252. Comparative Physiology. The physiological mechanisms of animals studied on a comparative basis. Prerequisite: Zoology 151 or equivalent. 4 units. *Professor Schmidt-Nielsen*

271. Cellular Physiology. The physiological processes of living matter approached through studies of cells. Prerequisites: two years of biology and at least one year of chemistry. 4 units. *Professor Wilbur*

274. Invertebrate Zoology. A study of structure, functions, and habits of invertebrate animals under normal and experimental conditions. Field trips will be made to study, collect, and classify animals in their natural habitats. Prerequisites: Zoology 1 and 2. 4 units. (Given at Beaufort.) *Staff*

278. Invertebrate Embryology. Lectures, readings, and laboratory work dealing with rearing, development, and life history of invertebrates. Prerequisite: Zoology 92. 4 units.* *Professor Bookhout*

For Graduates

351, 352. Departmental Seminar. A weekly meeting of graduate students and faculty to hear reports and to discuss biological facts, theories, and problems. One hour a week throughout the year. 1 unit credit by arrangement. *All Members of the Graduate Staff*

353, 354. Research. Students who have had proper training may carry on research under direction of members of the staff in the following fields: (A) Embryology, (B) Physiology, (C) Cytology, Histology, (D) Invertebrate Zoology, (E) Ecology, (F) Morphology, (G) Parasitology, (H) Vertebrate Zoology, (I) Limnology, (J) Entomology, (K) Genetics, (L)

Biophysics, (M) Animal Behavior, (N) Systematics, (O) Oceanography. Hours and credits to be arranged. *All Members of the Graduate Staff*

355, 356. Seminar. One or more seminar courses in particular fields are given each semester by various members of the staff. These will be in the field indicated under courses 353-354 above. 2 units.

Marine Laboratory. The following courses will be given at Duke University Marine Laboratory, Beaufort, N. C., during the summer of 1966: 203, Marine Ecology; 215, General Physical and Chemical Oceanography; 250, Physiological Ecology of Marine Animals; 274, Marine Invertebrate Zoology. Students with the proper training may register for 353 and 354, Research in Zoology.

Master's Degree for Students Specializing in Physical Therapy

Students specializing in physical therapy may request admission to the Graduate School and if admitted follow the curriculum for the Master of Arts degree of either the Anatomy or Physiology Department. Selected physical therapy subjects are integrated with the graduate courses the first year. A thesis and the remaining physical therapy courses and practicum may be completed the second year. Upon satisfactory completion of the requirements a Master of Arts degree and a Certificate in Physical Therapy will be awarded. For information concerning the Physical Therapy Program write Miss Helen Kaiser, Director, Physical Therapy Department, Box 3247, Duke University Medical Center.

Graduate Study in the Summer Session

The Summer Session of Duke University is divided into two terms. In 1966 the first term will begin on June 13 and will end on July 18. The second term will begin on July 20 and will end on August 24.

Graduate students who wish to work toward advanced degrees in the Summer Session, particularly in chemistry, economics, education, English, history, mathematics, religion, sociology, Spanish, and zoology, will find a selection of courses offered by members of the Duke faculty and by visiting professors. Other departments ordinarily offering work leading to the A.M. degree are botany, political science, and psychology. Thesis research for advanced graduate students is available also in other departments, such as botany, engineering, forestry, and physics.

Requirements for admission to the Graduate School are detailed above. Students who wish to be admitted to the Graduate School for work in the Summer Session should make application to the Dean of the Graduate School, as well as to the Director of the Summer Session, and should return the completed application, with supporting documents, before May 13, for admission to the first term, and before June 18, for admission to the second term.

Regulations Regarding Summer Work

(a) No graduate student may register for more than six units of credit in one Summer Session term. (b) All of the work required for the A.M.,

M.A.T., or M.Ed. degree must be completed within six years of the date of beginning. (c) Not more than one year of summer work can be accepted toward the residence requirements beyond the minimum for the Ph.D. or Ed.D. degrees. See p. 5 for a definition of a year's residence credit earned in Summer Sessions. Students who complete in a summer session the work required by the University for the Master's degree will be granted the degree in September.

A Summer Session Bulletin containing information about graduate courses may be obtained by addressing a request to the Director of the Summer Session, Duke University, Durham, N. C.

The School of Law
1966

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General Information

Law School: Its Purpose and Methods

The official name of the School is the Duke University School of Law, but it will be referred to in these pages as the Duke Law School or the Law School.

The Duke Law School stems historically from the School of Law of Trinity College, with its history of legal instruction running back to the middle of the past century, antedating the Civil War. When, in the 1920's, Trinity College became Duke University, the Law School was completely reorganized. This reorganization culminated with the housing of the Law School on the new West Campus in 1930, when the character of the Duke Law School can be said to have been reshaped.

The curriculum of the Law School provides thorough preparation for the practice of law in any state, and its graduates have been admitted to the bar throughout the nation. Opportunities for specialization in particular branches of the law are afforded.

In carrying out the trust imposed by the indenture establishing the Duke Endowment, the Law School seeks to have the student acquire knowledge and comprehension not only of legal doctrine, but also of the judicial process and of the social, economic, and political problems with which law and lawyers must deal. The method of instruction employed compels analysis of judicial opinions and inquiry into the non-legal as well as the legal considerations which underlie them. In ap-

propriate courses, special consideration is given to the work of the legislative and administrative agencies of government. In recognition of the increasing importance of the role of the lawyer in representing private interests before government agencies and in government service, a broad program is offered in the public law field. Scope for creative student work is provided by seminar courses and supervised individual study and research.

Practical training is not left for the first years of practice. A carefully integrated series of courses is designed to give students actual experience in the work of lawyers. Legal research, writing courses, moot court work, and practical study of steps in law suits in the first and second years are followed in the third year by seminar courses emphasizing trial techniques, legal planning and drafting, and interdisciplinary approaches. A student bar association affords a means whereby the student may gain acquaintance with the professional organizations through which a lawyer may and should contribute to the well-being of his profession and society.

Courses of Study and Degrees Offered

Bachelor of Laws Degree

Upon favorable recommendation of the Faculty, the degree of Bachelor of Laws will be conferred on students who shall have successfully completed six semesters' study of law, the last two semesters of work immediately preceding the granting of such degree having been completed in this School.

A student shall be deemed to have completed successfully six semesters' study of law if during this period he has completed the following requirements:

- (1) secured a passing grade in courses aggregating 84 semester hours;
- (2) secured in every required course a grade not requiring repetition thereof; and
- (3) secured a weighted average at least five points above passing, whether computed by including or by excluding the grades in the first-year courses.

Students who have spent only their last two semesters of study in residence in this School must have received a weighted average at least five points above passing for that year.

Course Requirements

First Year (Required)

	Semester Hours	
	Fall	Spring
Business Associations I		3
Chattel Transactions	2	
Civil Procedure	3	3
Contracts	3	3
Criminal Law & Procedure	2	2
Property I	2	2
Research & Writing	1	1
Torts	3	2
	<u>16</u>	<u>16</u>

Second and Third Years

In the absence of special authorization by the Dean, each student is required to take in each semester courses aggregating not less than 12 and not more than 16 hours.

The program in the second and third years is entirely elective. In planning his elective program, the student must bear in mind that certain courses are pre-requisites to other advanced courses:

Business Associations II is pre-requisite to the Seminars in Securities Regulation and Corporate Planning and Drafting.

Conflict of Laws is a prerequisite to the Seminar in Conflict of Laws. Evidence is prerequisite to Trial Practice.

Federal Taxation I is a prerequisite to Federal Taxation II and Federal Taxation III.

Federal Taxation I, Federal Taxation III, and Property II are pre-requisites to the Seminar in Tax and Estate Planning.

Labor Relations is prerequisite to the Seminar in Labor Law.

Trade Regulation is prerequisite to the Seminar in Public Regulation of Business.

Constitutional Law is prerequisite to the Seminar in Civil Liberties and Rights.

Electives and Seminars. The following elective courses and seminars are offered in the second and third years.

Fall Semester	s.h.
Business Associations II (O'Neal & Latty)	2
Comparative Law (not offered 1966-67)	3
Constitutional Law (Van Alstyne & Wallace)	3
Debtors' Estates (Shimm)	3
Equitable Remedies (not offered 1966-67)	2

Evidence (Strong)	3
Family Law (Baade)	2
Federal Taxation I (Lowndes)	3
Federal Taxation II (Lowndes)	3
Insurance (Wetherington)	2
International Law (Baade)	3
Labor Relations (Livengood)	3
Land Use and Development (Johnston)	3
Legal Accounting (not offered 1966-67)	2
Legal History (not offered 1966-67)	3
Legal Process (not offered 1966-67)	3
Military Law (Everett)	2
Mortgages (Wetherington)	2
Municipal Corporations (Everett)	2
North Carolina Practice (Bryson)	2
Patent Law (not offered 1966-67)	1
Property II (Sparks)	3
Sales (Shimm)	3
Seminar in Civil Liberties & Rights (Wallace)	2
Seminar in Criminal Law (Livengood)	2
Seminar in Legislation (Paschal)	2
Trade Regulation (Havighurst)	3
Workmen's Compensation (Larson)	2

<i>Spring Semester</i>	<i>s.h.</i>
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Administrative Law (Gellhorn)	3
Admiralty (Wetherington)	3
Business Associations II (O'Neal & Latty)	2
Civil Liberties and Rights (Wallace)	2
Conflict of Laws (Baade)	3
Copyright and Unfair Competition (Wallace)	3
Constitutional Law (Van Alstyne & Wallace)	2
Corporate Planning and Drafting (O'Neal)	2
Federal Jurisdiction (Paschal)	3
Federal Taxation I (Lowndes)	3
Federal Taxation III (Lowndes)	3
International Economic Relations (Baade)	3
International Organizations (not offered 1966-67)	2
Jurisprudence (not offered 1966-67)	2
Legal Profession (Hardin)	1
Negotiable Instruments (Wetherington)	2
North Carolina Statutes (Bryson)	2
Property II (Sparks)	3
Regulated Industries (not offered 1966-67)	2
Securities Regulation (Havighurst)	3

Seminar in Criminal Procedure (Everett)	2
Seminar in Estate Planning (Johnston)	2
Seminar in Labor Law (Livengood)	2
Seminar in Trade Regulations (Havighurst)	2
Seminar in Urban Renewal (Everett)	1
Social Legislation (Livengood)	2
State and Local Taxation (not offered 1966-67)	2
Trial Practice (Hardin & Strong)	2
World Law (Larson)	2

Graduate Study in Law

The graduate program is framed with a view to the encouragement and recognition of legal scholarship. It is designed for the qualified candidate who aspires to a teaching career, or who wishes to become proficient in a special field of the law, to do legal research, to prepare himself for a public-law practice in or out of government, or to pursue studies in subjects he has not explored previously. This program is especially suitable for law teachers and for those who wish to become either law teachers or specialists in the law and who wish to carry on advanced study and original research under faculty supervision, and for foreign law students, teachers, and lawyers who desire to extend their knowledge of the laws of the United States and to engage in comparative legal research.

Three graduate degrees are granted: the degree of Master of Laws (LL.M.), the degree of Master of Comparative Law (M.C.L.), and the degree of Doctor of Juridical Science (S.J.D.).

Master of Laws Degree

The degree of Master of Laws is reserved for students who, having demonstrated their capacity for graduate work in law, maintain a level of scholarship substantially higher than that required for the degree of Bachelor of Laws.

Course Requirements

The candidate for this degree is required to complete a course of study comprising not less than twenty nor more than twenty-six semester hours, or approved research equivalent thereto. Two full semesters are required for the completion of this program. A candidate for this degree is required to include in his course of study at least two courses or seminars selected from those offered in Jurisprudence, in Legal History, and in the international or comparative Law area. Other suitable courses will be selected by the candidate subject to the approval of the Committee on

Graduate Study. In special circumstances, credit of not more than two hours a semester may be given for approved special supervised research projects. In addition to completing twenty semester hours of courses or seminars the candidate must prepare and submit an essay, representing substantial research on a legal subject. This essay is to be prepared under the supervision of the instructor in charge of the field in which the research is done. The candidate will find it helpful to have formulated a project of research, or alternative projects, before his admission to graduate study or, at any rate, before pursuing his graduate study in residence. In appropriate cases, the candidate will be permitted, and may be encouraged, to take related work in other departments of the University.

Master of Comparative Law Degree

The degree of Master of Comparative Law is awarded only to students who maintain a level of scholarship substantially higher than that required for the degree of Bachelor of Laws.

Course Requirements

The candidate for this degree is required to complete a course of study comprising not less than twenty semester-hours. At least two semesters' residence are required for the completion of this program. A candidate for this degree is required to include in his course of study at least two courses from those offered in the world law and comparative law area, and either Jurisprudence or Legal History. Other suitable courses will be selected by the candidate subject to the approval of the Committee on Graduate Study. In special circumstances, credit for not more than two hours a semester may be given for approved, supervised research projects. The candidate is also required to submit an essay representing substantial research on a subject of comparative or international law, written in the English language. This essay is to be prepared under the supervision of the instructor in charge of the field in which the research is done. In appropriate cases, the candidate may be permitted and may be encouraged to take related work in other departments of the University.

Doctor of Juridical Science Degree

Upon recommendation of the faculty, the degree of Doctor of Juridical Science will be conferred on students admitted to candidacy for that degree who complete and submit a monograph or series of essays suitable for publication and deemed by the faculty to be of distinguished character and who pass an oral examination before a special committee appointed for that examination.

Requirements

At least one academic year and, in the absence of an extension granted by the faculty, not more than three years must elapse between the award of the Master's degree and the award of Doctor of Juridical Science. Students who have received the Master's degree from another law school must spend at least two full semesters engaged in research at this School, and in addition may be required to complete a course of study prescribed by the Committee on Graduate Study. The monograph or series of essays required may be based upon, or be an extension of, the essay required for the Master's degree, provided substantial additional research is represented.

Resources for Study

The Law School Building

The new Law School Building was completed and occupied in September, 1962. Located just off the Gothic core of the West (main) Campus, the building is of modified Georgian architecture with contemporary overtones. It reflects a notable characteristic of the School: a high ratio of facilities to students admitted. Despite long-range plans to keep the student body modest in size, the new Law Building in its general spaciousness, number of classrooms and seminar rooms, library reading-room seatings, library stack spaces, student carrels, student lockers, student lounge rooms, faculty offices, quarters for legal publications, special quarters for institutional studies, and courtroom is of proportions ordinarily associated with a far larger student body.

Additional information concerning the Law School and its facilities is contained in the illustrated brochure *Studying Law at Duke*.

The Law Library

The Law Library is one of the large law school collections in the country. It consists of American and English statutory and case law; collections of international, comparative, and foreign law materials; treatises;

digests; encyclopedias; the various selected case series; a comprehensive collection of legal periodicals; and publications in the fields of history, economics, government, and other social sciences, supplemental to the strictly legal materials. The Library receives every current legal periodical of general interest printed in the English language and complete up-to-date legislation of the United States and of every state and territory of the Nation.

There are many thousands of additional volumes of a legal nature in the main University Library Building, as well as the general collection of over a million volumes, to all of which the law students and faculty have convenient access.

The Law Library is administered by a professionally trained staff and is open to the public daily, as well as in the evenings when the Law School is in session.

Rule of Law Research Center

In the fall of 1958, the Duke Law School established its Rule of Law Research Center, with Professor Arthur Larson as its Director.

The purpose of the Center is to undertake both long-range and current studies and publications bearing on the settlement of international disputes and the achievement of peaceful change under law. Typical projects include two recently published books; *Sovereignty Within the Law* and *Propaganda: Toward Disarmament in the War of Words*, and studies of Population Control Laws, and Compliance . . . and Enforcement under International Law. The Center also produces studies and publications in the field of the law of civil rights and race relations. A staff of international lawyers is maintained, together with an undergraduate law student research assistant staff which generally numbers about twelve. The regular staff includes specialists in all the world's major legal systems. Opportunities for course work at the Law School include not only the regular courses in International Law, Comparative Law, International Organizations, and the Law of International Economic Relations, but a unique Seminar in World Law for students particularly interested in this approach to the problem of world order.

Duke University students are also encouraged to combine graduate work with activities of the Center, opportunities for which are made available as far as practicable.

Student Life

Living Accommodations

Housing

The Men's Graduate Center is available to men enrolled in the Law School. Epworth Inn on the Woman's College Campus is available to women enrolled in the Law School.

A resident student, in order to retain his room for the succeeding academic year, must make application at the office of the Housing Bureau for confirmation of the reservation.

The authorities of the University do not assume responsibility for persons selected as roommates. Each student is urged to select his roommate when the room is reserved. Any student who occupies a double room without a roommate will be given written notice from the Housing Bureau to obtain a roommate or he may be required to pay the rental consideration for the whole room.

Any exchange of rooms must be made at the Housing Bureau. Persons exchanging rooms without the approval of the Housing Bureau will be subject to the charges for both rooms.

Duke University Apartments, which consist of efficiency, one-, and two-bedroom apartments, are available to married graduate students. The apartments are complete with basic furnishings. Heat, electricity (except for window fans and air conditioners), hot and cold water, garbage and

trash collection, and maintenance of grounds are all included in the rental charge. For further information on married student apartments, write to the Director of Housing, Duke Station, Durham, North Carolina.

Residence hall rooms and Duke University Apartments may be reserved by new applicants after they have been accepted officially for admission to the School of Law. Applications for residence hall rooms are to be made to the Director of Housing, Duke Station, Durham, North Carolina. For fees and deposit details see pages 21-23.

Food Services

Food service is cafeteria style. The dining facilities on the West Campus include three cafeterias with multiple-choice menus, a grill, and the Oak Room where full meals and *a la carte* items are served. In the Men's Graduate Center there is a cafeteria with multiple-choice menus and a Coffee Lounge where sodas and sandwiches are served from 11:30 a.m. to 11:00 p.m.

Services Available

Medical Care

With exceptions noted below, full medical and surgical care is furnished to all regularly matriculated law students of the University who have paid the semester tuition. This service is under the direction of the physician in charge with the cooperation of the staff of Duke Hospital. It includes hospitalization (limited to thirty days), medical and surgical care, drugs, dressings, x-ray studies, and ward (but not special) nursing. A charge for board is made at the same rate as in the University dining halls. Refraction of eyes and treatment of teeth and of all chronic and pre-existing conditions, such as diseased tonsils, hernia, elective surgery, chronic skin conditions, and endocrine disturbances, or accidents or illnesses occurring during vacations or while off the campus are not included in this service. The cost of any necessary braces and orthopaedic appliances, as well as special nursing, must be borne by the patient. If the student has insurance providing hospitalization, surgical, or medical benefits, the benefits shall be applied to the cost of his medical care.

Placement Service

Duke Law School's placement service is a very active one, in constant touch with leading law firms of the nation, federal and state agencies, corporate legal departments, and other employment opportunities. Special attention is given to placing second year students in summer internships in the summer of the second year.

The Duke Legal Internship Program

In the summer of 1965 the Law School, with the aid of a grant from the National Defender Project, initiated a summer internship program, wherein second and third year law students aided court-appointed defense counsel in the defense of criminal cases. The program, which was organized and directed by Professor Everett, brought the student interns into contact with a variety of problems in the administration of criminal justice as they participated, under the supervision of qualified lawyers, in the investigation of criminal cases, their preparation for trial, and to a limited extent in actual trials. In order to afford the interns an opportunity to acquire a broader perspective, the solicitors (prosecuting attorneys) of Durham and Wake Counties (the two counties in which the program was operating) also allowed the students some opportunity to observe the trial process from the prosecution's standpoint. Guest lecturers and the instructor met with the interns to discuss specific areas of criminal law and procedure and to evaluate their work and discuss their problems. Due to the success of the program in its first year, the National Defender Project has extended the grant, and the program will be enlarged somewhat in length and scope. Moreover, it is being coordinated with several other legal services projects which are now being organized in the region with the cooperation of the Duke Law School as part of the local anti-poverty program.

Employment Opportunities

Although it is not advisable for a law student to undertake any substantial amount of outside work, arrangements have been made to provide part-time employment for capable law students who otherwise would be unable to meet the expense of studying law at Duke.

A number of positions as assistants in the Law Library and as research assistants are open to students, particularly in their second or third years, with some preference being given to those who do not receive other aids from the University.

Professional and Honorary Organizations

The Duke Bar Association

The Duke Bar Association is the student governing organization of the Law School and is organized along the lines of the American Bar Association. Its purpose is to introduce the student to the problems considered by the Bar in professional organizations and to develop professional consciousness and responsibility.

The Duke Bar Association sponsors professional and social activities throughout the year. Dues are \$15.00 per annum, payable in September.

Order of the Coif

A chapter of the Order of the Coif, national legal scholarship society, has been established at Duke University School of Law. Its purpose is "to foster a spirit of careful study and to mark in a fitting manner those who have attained a high grade of scholarship." Election is restricted to the ten per cent of the graduating class who have attained the highest rank in their law school work.

Moot Court Board

A program of student Moot Court arguments is conducted under the supervision of the Moot Court Board as a part of the course in Research and Writing in which all first year students are required to participate. In addition, a team of students is selected each year to represent the Law School in the National Moot Court competition.

International Law Society

Recognizing the importance of the role of law in international affairs, the Duke International Law Society provides a program for examining the application of international law to world problems. Through a series of lecture-discussions in the fall called "A Short Course in International Law" and by featuring distinguished speakers in the field throughout the year, the Society provides its members the opportunity to make contact with the men and ideas that are shaping the development of international law.

Other activities include participation in the annual Philip C. Jessup International Law Moot Court competition, attendance at conferences sponsored by the Association of Student International Law Societies, and entry into various writing contests.

Membership is open to all law students at \$5.00 per annum.

Recreational Facilities

The University is located about two miles from the business district of Durham on wooded hills constituting part of the five-thousand-acre Duke Forest, which is maintained by the School of Forestry. Within a short distance from the campus are facilities for golf, horseback riding, and woodland hiking. Students of the Law School are entitled to the use of the University gymnasium, tennis courts, swimming pool, golf course, and

similar privileges. Other opportunities for physical activity are available through the Intramural Program as well as through such activity groups as the outing club, sailing club, and cycling club. Skiing has been increasingly enjoyed by various groups. Several bowling alleys are available in and near Durham. Motion pictures are shown in Page Auditorium twice a week, and concert programs, recitals, lectures, and plays are presented frequently.

Publications

Law and Contemporary Problems

The School of Law publishes a quarterly, *Law and Contemporary Problems*, edited by Professor Clark C. Havighurst. This periodical, now in its thirty-first volume, presents in each issue a symposium on a problem of current importance, in which the inter-related social and economic, as well as legal, factors are discussed by writers of competence in these respective fields.

The circulation of *Law and Contemporary Problems* extends not only to members of the legal profession and law libraries throughout the country, but also to industrial and financial concerns, governmental agencies, and public and general university libraries. Individual issues are not infrequently used as materials for study in University courses.

Duke Law Journal

American legal education boasts at least one unique institution. Only in America, and only in law, are the scholarly professional journals edited and largely written by students. The *Duke Law Journal* carries forward this proud tradition, which dates from the latter part of the nineteenth century. Articles written by teachers, lawyers, judges, and other scholars are critically evaluated and edited by the board of student editors. Notes and comments concerning recent judicial, legislative, and other developments are written by the students themselves, and edited by their fellow students. Members of the faculty are of course available for advice and consultation. The quarterly issues are widely circulated and become an integral part of the store-house of informal and critical materials to which the profession in all its branches must resort. The student-edited law journal has had a profound influence on the growth and development of the law.

Membership in the *Journal* is the highest honor that can be attained by the student, being reserved for those who not only excel in their courses but also demonstrate capacity to do creative research and writing. Moreover, in the well-nigh universal judgment of the profession, the experience

gained in this work provides the best training that the Law School has to offer. It should be the aim of every qualified student to take advantage of this opportunity.

Corporate Practice Commentator

The *Corporate Practice Commentator*, a quarterly periodical devoted to significant developments and new thinking in the field of corporation law and practice, is edited by Dean-elect F. Hodge O'Neal. Although the *Commentator* is published by a commercial concern, it is assembled and the manuscripts are prepared in the School of Law under the direction of Professor O'Neal. The *Commentator* gives attention to matters of interest and importance to counselors and managers of corporate and other business enterprises. Primary emphasis is placed on corporation law and practice in the narrow sense, but a considerable amount of space is devoted to antitrust questions, labor matters, patents and copyrights, executives' compensation, fair trade legislation, and other matters arising from business activities.

Admission

Beginning students may enter only at the opening of the fall semester in any year. Students who have completed the first year of law study at this or any other law school approved by the Association of American Law Schools may enter at the beginning of any semester.

Procedures for All Applicants

Application must be made on the prescribed Law School application blank which will be sent upon request. A fee of \$10.00 is charged for filing an application. No applicant will be accepted until all required documents are on file. These documents are: (1) the application itself, to which a recently made personal photograph must be attached; (2) a transcript of college record; (3) a report of the applicant's score on the Law School Admission Test, described below; and (4) letters from an official of the college attended and from three or more responsible persons who are acquainted with the applicant's character and general qualifications. *These letters will be requested by the Law School*, and the applicant need only furnish the names and addresses of persons from whom the desired information can be obtained.

Most of our applicants apply at a time when they are still in college, either in the fall or winter of their current college year. We do not ordinarily wait for the completion of the current year's college work before admitting an applicant; normally we take acceptance action on the

basis of a transcript showing college work through the junior year, although we may at times ask for a transcript showing also one semester or term of the senior year. Such acceptance is tentative only and is subject to our final action taken in the light of the further supplemental transcript showing all the college work required for admission to the Law School. (However, it is very rare for an accepted applicant to be rejected later on the basis of his completed transcript.) A good time for a student in college to apply, particularly if he has an outstanding record and wants to make his law school plans early, is in the fall of his final year.

The Law School Admission Test, referred to above, is administered by the Educational Testing Service. It is given four times a year at examination centers conveniently located throughout the United States. No special preparation for the test is suggested, since it is designed to measure aptitudes, abilities, and general background rather than knowledge of subject matter. The applicant's score on the test will be considered along with other data in passing upon his admission to the Law School. Application forms and information concerning the test should be procured by writing directly to the Educational Testing Service, 20 Nassau Street, Princeton, New Jersey.

Requirements for Admission

An application for admission to Duke Law School as a candidate for the degree of Bachelor of Laws may be submitted by any person who is a graduate of a college of approved standing. Applications may also be submitted by a candidate who has completed in a college of approved standing work equivalent in number of units to three-fourths of that required for graduation and whose college work is of outstanding superior quality and in its entirety shows an average grade far above that required for graduation, the requirement in each case being determined by the regulations of the college where the work was taken.

Admission of Students in Combined Course Program

A number of colleges, upon application by their students, have permitted those who have completed three years of undergraduate work to enter the Duke Law School and upon the satisfactory completion of the first year of law school work to receive their Bachelor of Arts degree from such colleges. It is suggested that students desiring to enter Duke Law School under such a program make inquiry of their proper college authorities regarding this point if they meet the applicable requirements for admission. Not over three per cent of an entering class is admitted on this basis.

A student from an undergraduate college of Duke University who has

completed therein three years of study may apply to that college to enroll in a combined course wherein his first year of law study may be accepted toward the Bachelor of Arts degree. Upon the completion of four additional semesters of law study, he will receive the Bachelor of Laws degree.

Students considering entrance before obtaining the Bachelor's degree should consult the rules of the Board of Bar Examiners in the state where they plan to practice law, for regulations applicable to this program.

Admission to Advanced Standing

Any person who has complied with the requirements for admission set forth in this announcement prior to the commencement of his law study, who presents evidence of the satisfactory completion of at least one year of study at any law school which is a member of the Association of American Law Schools, and who is eligible for readmission to the law school from which he proposes to transfer, may be admitted to advanced standing, subject to such rules as would be applicable to students in this School having a comparable scholastic record. Provisional credit for courses so completed will be given, final credit being conditioned on the completion of at least one full year of law study in this School with an average at least five points above the passing grade. Adjustment of credit for work done in such other law schools may be made by the Dean or by vote of the faculty.

Admission of Candidates for Graduate Degrees

Applications for admission to graduate study should be addressed to the Dean of the Law School and should include transcripts of records of legal and prelegal work. For the requirements for the graduate degrees, see pages 6-8.

Master of Laws Degree

Any person who has received the first degree in law from a law school which is a member of the Association of American Law Schools, or from a university in the United Kingdom of Great Britain and Northern Ireland, or in Australia, Canada, Eire, or New Zealand, may be admitted as a candidate for the degree of Master of Laws, provided he satisfies the Committee on Graduate Study that his objective in desiring to do graduate work in law is consistent with the purposes for which the program is offered, and provided he demonstrates to the Committee, on the basis of his record, his capacity to take and profit by graduate work in law. Normally the applicant will be required to show a level of scholarship appreciably higher than that required for the first degree in law at the

institution from which he received that degree. Those applicants who aspire to a teaching career are expected to have had, and are expected to maintain throughout their graduate studies, an exceptionally high academic record.

Master of Comparative Law Degree

Any person (1) who has received the degree of *doctor iuris* or its equivalent from a foreign university, or (2) who, having completed such academic training as is required in his country for the practice of law, has already demonstrated his special qualifications by publications in learned journals or otherwise, and who has the knowledge of and facility in the English language needed to achieve distinction in competitive study at an American university may be admitted as a candidate for the degree of Master of Comparative Law (M.C.L.). The applicant must satisfy the Committee on Graduate Study that his objective in doing graduate work in comparative law is consistent with the purposes for which the program is offered, and he must further demonstrate to the Committee, on the basis of a scholastic record comparable to at least a B average at an American law school of high standing, and by his previous publications, if any, his capacity to profit by graduate work in law. Normally, admission to candidacy for this degree is limited to applicants who intend to study one or more specific fields of American law with a view to utilizing such knowledge upon their return to their respective countries, and who have already done some preparatory work in this direction.

Any person eligible to be admitted as a candidate for the degree of Master of Laws may, upon recommendation of the Committee on Graduate Study, be admitted to candidacy for the degree of Master of Comparative Law.

Doctor of Juridical Science

A person holding the degree of Master of Laws or Master of Comparative Law (or Jurisprudence) from this or any other law school which is a member of the Association of American Law Schools may, on recommendation of the Committee on Graduate Study and favorable vote of the faculty, be admitted to candidacy for the degree of Doctor of Juridical Science (S.J.D.), provided he completed the work for the Master's degree with distinction.

Financial Information

Fees and Expenses

It is estimated that the expenses of a thrifty unmarried student at Duke Law School, aside from tuition, can be kept around \$1,400.00 per academic year.

Tuition

Tuition is due and payable not later than the day of registration for a particular semester. For the academic year 1966-1967, the tuition is \$700.00 a semester. After the final day of registration no refund of the tuition will be made except for involuntary withdrawal to enter the armed forces.

Registration Deposit

Admitted applicants are required to deposit the sum of \$50.00 with the Office of the Bursar. This deposit is nonrefundable, but will be credited to the account of the matriculated student.

Living Accommodations

Housing. The Men's Graduate Center is available to men enrolled in the Law School. The rooms are equipped for two persons and the rental

charge for a double room is \$620.00 for the academic year or \$310.00 for each occupant (\$155.00 per semester for each occupant).

Epworth Inn on the Woman's College Campus is available to women enrolled in the Law School. The rental charge for a single room is \$405.00 for the academic year or \$202.50 for each semester. The rental charge for a double room is \$670.00 for the academic year or \$335.00 for each occupant (\$167.50 per semester for each occupant).

Duke University Apartments, which consist of efficiency, one-, and two-bedroom apartments, are available to married graduate students. The apartments are complete with basic furnishings and the current rental charges per month are \$70.00 for the efficiency, \$90.00 for the one-bedroom, and \$110.00 for the two-bedroom apartments.

Room Deposit. A \$25.00 deposit is required of each applicant before a residence hall room reservation is made. The initial room deposit is effective during the student's residence in the University residence halls if attendance is continuous in regular academic years.

Refund. The deposit will be refunded under the following conditions:

1. Within thirty days after the student has been graduated provided written notice is received at the Housing Bureau requesting refund.
2. Upon withdrawal from Duke University Residence Halls by students enrolled on the semester basis, provided written notice is received by the Director of Housing by August 1st for cancellation of a reservation for the fall semester, and not later than January 15th for cancellation of a reservation for the spring semester.
3. When the reasons requiring withdrawal are beyond the student's control.

No refund will be made until the occupant has checked out of his room through the Housing Bureau and has settled his account with the Bursar.

Rooms are rented for the academic year but for no period of less than one semester without special arrangements. After the day of registration, no refund of room rent will be made except for involuntary withdrawal to enter the armed services. Such refunds will be made in accordance with the University's established schedule. Regulations governing the occupancy of rooms will be supplied by the Director of Housing to those students who make application for housing.

Food Service. Food service is cafeteria style. The cost of meals runs approximately \$1.75 to \$2.50 per day, depending on the need and taste of the individual. The dining facilities on the West Campus include three cafeterias with multiple-choice menus, a grill, and the Oak Room where full meals and *a la carte* items are served.

In the Men's Graduate Center there is a cafeteria with multiple-choice menus and a Coffee Lounge where sodas and sandwiches are served from 11:30 a.m. to 11:00 p.m. The prices in these dining rooms are the same as on the West Campus.

Late Registration Fee

Students who register in any semester at a date later than that prescribed are required to pay to the Office of the Bursar a \$5.00 penalty for late registration.

Athletic Events Fee

Law students may secure admission to all regularly scheduled University athletic contests held on the University grounds during the entire academic year by payment of the athletic fee of \$15.00 per year plus any taxes that may be imposed. (This fee is payable in the fall semester.) They also may use the facilities of the Duke Golf Course upon payment of student green fees.

Motor Vehicle Registration Fee

Each motor vehicle operated on the campuses by students enrolled in the School of Law must be registered at the Traffic Office in the Social Science Building, and a \$30.00 registration fee must be paid at this time.

Financial Aid

Scholarships

Scholarships are available, varying in amount. Except for a few scholarships that are based purely on merit, scholarships are awarded only to needy applicants with markedly superior college records and comparable Law School Admission Test scores. A scholarship may cover all or part of the tuition charge. The more usual form of financial aid is a combination of scholarship and loan. Scholarship grants will be continued to second- and third-year students maintaining a high standard of work.

Loans

To the extent of the funds allocated to Duke University from its participation in the student loan program established under the National Defense Education Act of 1958, loans up to \$2,000 per year (so limited as of the present writing) are available to Duke students. Interest on these loans begins to accrue at three per cent one year after the student leaves the School, and repayment normally begins two years after the student leaves the School, with complete repayment scheduled over a ten-year period. Recent changes in this law have been enacted but the 1958 law continues effective for the time being. The changes will not substantially alter the benefits available to students.

Loans from funds held in trust by the University are also available to qualified law students. Interest on these loans, which mature after the student has left the School, accrues from the date of each note at the rate of one per cent until the student has left the School and for five years thereafter at three per cent per year, with repayment in installments over the five-year period. Loans from these funds are available up to \$1,200 per year, less the amount of any loan made under the paragraph above.

Approval of loan application is based on the financial need, scholastic attainment, and personal integrity of the applicant. Unmarried students with automobiles, who plan to live on campus, must establish a bona fide need for the automobile before a loan application will be approved.

In addition to the loans above mentioned, the School participates in the American Bar Association Loan Fund and United Student Aid Fund programs. These programs provide guaranteed commercial bank loans to needy law students, up to \$1,000 per year. These loans are readily available.

A special fund is also available for law students for small loans to tide over temporary financial emergencies arising during the course of the year.

Registration and Regulations

Registration

All students are required to register on the dates prescribed in the Law School Calendar, at which time class schedules and course cards must be filled out and approved. A student's registration for any semester is not complete until he has settled all indebtedness with the Office of the Bursar. Students who register in any semester at a date later than that prescribed are required to pay to the Office of the Bursar a \$5.00 penalty for late registration.

Academic Regulations

Course Requirements

Minimum and Maximum Student Loads

No regular student is permitted to take less than twelve course hours per semester. No first year student is permitted to take courses in excess of the first year program. Second and third year students are not permitted to take for credit more than sixteen course hours per semester, nor to audit and take for credit more than seventeen course hours per semester.

In exceptional cases, with the consent of the Dean a student may take more or less than the prescribed maximum or minimum loads, but no student shall receive full residence credit if he takes fewer than the ten hours per semester for credit required for approved schools by the American Bar Association.

Scholastic Standards

Eligibility to Continue Law Study. Any student who at the end of his first year or at the end of any subsequent semester has an average grade lower than D on all the work then taken is ineligible to continue his work in the School. Any other student (1) whose average final grade at the end of his first semester is below D, or (2) whose average grade at the end of any subsequent semester on all the work then taken is below C, or (3) who in any single semester or in any single year receives failure grades in courses totaling eight or more semester hours, may at any time be declared by the Dean ineligible to continue.

Notification of Unsatisfactory Scholastic Standing. Every student subject to the provisions of the second sentence of the paragraph above, who has not been declared ineligible to continue his work in the School will be given a formal, written notice by the Dean's Office. This notice will set forth his average grade or grades and inform him (1) that he will be subject for the ensuing year to the special supervision of the Dean, who may order his dismissal from the School in the event of his failure to maintain a satisfactory scholastic standard, and (2) that he will be ineligible to receive a degree unless his work meets the scholastic requirements for graduation, which will be set forth in full in such notice.

Every other student whose average final grade at the end of any semester on the work of that semester, or on all work then taken, does not exceed the minimum average grade required for graduation by more than two points will be given a notice similar to that provided for above.

Attendance Regulation

Regular class attendance is required. The right to take the examinations, as well as the privilege of continuing one's membership in the School at any time, is conditioned upon regular attendance at the exercises of the School.

Nonacademic Regulations

Motor Vehicles

Each motor vehicle operated on the campuses by students enrolled in

the School of Law must be registered at the Traffic Office within 5 days after arrival, and thereafter must display the proper registration emblem. To register a vehicle, the student must pay the prescribed fee of \$30 and present the following documents:

1. State vehicle registration.
2. State operator's license.
3. Evidence of automobile liability insurance as required by North Carolina law: \$5,000 per person and \$10,000 per accident for personal injuries, and \$5,000 property damage.

Parking, Traffic, and Safety Regulations will be given each student registering his vehicle. Students are expected to abide by these regulations.

Conduct of Students

All students are admitted subject to the rules of the University and of the Law School, and continuance in the School is conditioned upon the observance of such rules.

The University expects of its students loyal and hearty cooperation in developing and maintaining high standards of conduct and scholarship. The University, therefore, reserves the right, and matriculation is a concession by the student of this right, to compel the withdrawal of any student whose conduct at any time is not satisfactory to the University.

Registration for Bar Examination

Many states now require that a student, prior to or shortly after beginning of the study of law, register with the board of bar examiners of the state if he intends to practice therein. Each student should ascertain by writing to the secretary of the board of bar examiners of the state in which he plans to practice, or by other channels of information, whether that state makes this requirement.

Descriptions of Courses

Business Courses

Business Associations I. Legal principles concerning association in business by agency, partnership, other unincorporated forms and corporations. Creation, form and nature of agency, partnership and corporation, corporate existence (de facto corporations, corporate entity and its limitations), powers, duties, liabilities and compensation of agents, partners, officers and directors, risks in conduct of business by representatives (vicarious liability in tort, authority to contract), imputation of notice and knowledge, scope of enterprise (ultra vires), revocation and termination of authority, ratification, undisclosed business associates, stability of the associational relationship. The purpose of this course is to grasp basic principles of Agency and Partnership and introductory related principles of corporation law. (The main basic study of corporation law, however, is in Business Associations II.) 3 s.h. (spring). *Latty*

Business Associations II. Promoters, subscription to and issue of shares, stock structure and corporate capital, dividends, preferred stock, bonds, capital increases and reduction, corporate re-acquisition of own stock, elementary principles of corporate accounting, public issue of securities, stock transfers, fundamental corporate changes (recapitalization, sale, merger and consolidation, dissolution), stockholders' suits, and certain principles concerning management and operation not studied in Business Associations I. 2 s.h. each semester. *O'Neal and Latty*

Contracts. The formation and legal operation of contracts, their assignment, significance to third parties, and relationship to torts, restitution; and commercial law developments, the variety, scope, and limitations on remedies, and the policies, jurisprudence, and historical development of promissory liability. 3 s.h. each semester. *Van Alstyne*

Seminar in Corporate Planning and Drafting. The student is given hypothetical corporate problems (perhaps taken from the practicing lawyer's desk) on a client's proposed course of action; each problem is designed to require the student to grasp the business situation and goals involved, analyze for pertinent legal principles, plan the transaction to avoid legal business (including taxation) pitfalls, plan the requisite steps to consummate the desired transaction, draft the appropriate papers and present his research. 2 s.h. (spring). *O'Neal*

Debtors' Estates. Comparative study of methods used for the liquidation of debtors' estates. The nonbankruptcy materials cover individual creditor's rights by attachment, garnishment, execution, creditors' bills and the like; common law compositions and extensions; and general assignments. The bankruptcy materials cover, in the main, the first seven chapters of the Bankruptcy Act. 3 s.h. (fall). *Shimm*

Insurance. The nature of "insurance"; government supervision and control; types of insurance organization; the legal requirement of insurable interest; interests of others than the named insured; the measure of indemnity; subrogation; the beneficiary's interest in life insurance; the insured event and excepted causes; warranties, representations and concealment; the making of insurance contracts; waiver, estoppel and election. 2 s.h. (fall). *Wetherington*

International Economic Relations. See Public Law Courses, page oo, for description.

Legal Accounting. An examination and analysis of accounting principles and practices necessary for reasonably effective collaboration with accountants on problems requiring the work of both lawyers and accountants. The course is designed to develop in the student an understanding of how an accountant's work is used by top management in making decisions, by government in making and enforcing regulations, and by investors and lenders in exercising a discriminating choice in the employment of their funds. (Not offered in 1966-67.)

Negotiable Instruments. Study of the rules of the law merchant and the provisions of the Negotiable Instruments Law and the Uniform Commercial Code relating to the functions and legal incidents of checks, bills of exchange, promissory notes, and similar commercial instruments. 2 s.h. (spring). *Wetherington*

Sales. Study of the rules of the common law and the provisions of the various uniform acts and the Uniform Commercial Code relating to warranties, risks, remedies for breach, financing, and other legal problems arising in the sale of goods. 3 s.h. (fall). *Shimm*

Seminar in Regulated Industries. See Public Law Courses, page 34, for description.

Securities Regulation. See Public Law Courses, page 33, for description.

Trade Regulation. See Public Law Courses, page 34, for description.

Property Courses

Chattel Transactions. This course uses the field of Personal Property and the traditional title-passing rules of Sales to appraise judicial reasoning and legal concepts. It serves both as a low-level course in judicial methodology and an introduction to commercial law. It deals with possession and title of chattels, the bailment relationship, artisan's lien, transfer of chattels by gift and miscellaneous inter-vivos transactions. It does not go into details of enforcement of buyers' and sellers' rights or sales financing. 2 s.h. (fall). *Latty*

Land Use and Development. A survey of legislative, administrative, and judicial controls utilized to facilitate the orderly development and redevelopment of real property. This consideration will include public and private nuisance, zoning, subdivision control, housing codes, street mapping, and condemnation. The clash of individual and societal interests in land use is explored through cases involving the distinction between valid police power regulations and "takings" for public use which require payment of compensation. Problems of urban renewal, regional planning, and pollution of water and air will also receive consideration. 3 s.h. (fall). *Johnston*

Property I. The basic concepts of real property law and conveyancing. Historical background; estates in land, including the fee simple, the fee tail with its statutory substitutes, the life estate, the estate for years and other non-freeholds; concurrent ownership; types of future interests; conveyances before and after the Statutes of Uses; landlord and tenant; the modern deed—kinds, delivery, description, title covenants; covenants and agreements running with the land at law and in equity; easements; recording and title registration. 2 s.h. each semester. *Sparks*

Property II and Property III. The various rules and concepts governing transmission of property from one generation to another, including the materials normally covered in the traditional courses on Wills, Trusts and Future Interests. Historical background; intestate succession at common law and under modern statutes; limitations upon testamentary power; execution and revocation of wills; contest of wills; lapse, ademption and satisfaction; the nature, creation, elements, enforcement and administration of trusts; future interests, comprising reversions, remainders, executory interests, rights of entry, possibilities of reverter, and their

incidents; class gifts; powers of appointment; rule against perpetuities and other restrictions on the creation of interests; construction of wills, trusts and deeds. Property II (fall) and Property III (spring). [Students may take one or both semesters.] 3 s.h. (each semester). *Sparks and Johnston*

Security. Mortgage and security interests in real property, and suretyship. 3 s.h. (spring). *Wetherington*

Seminar in Tax and Estate Planning. Seminar devoted to problems and techniques of tax and estate planning. Enrollment limited. 2 s.h. (spring). *Johnston*

Public Law Courses

Administrative Law. The formulation of statutory schemes of administrative regulations: the organization of administrative agencies; the determination, promulgation and enforcement of administrative programs; the respective spheres of administrative and judicial responsibility; judicial control over administrative action. Practice and procedure before administrative agencies: informal conferences and negotiations; formal hearings; constitutional limitations. 3 s.h. (spring). *Gellhorn*

Seminar in Civil Liberties and Civil Rights. Studies in the field of personal liberties (freedom of speech, press, religion, association, etc.) and in the field of civil rights (right to non-discriminatory treatment, right to fairness in procedure, etc.). The seminar will be concerned with issues about which the law is unsettled, and especially with issues raised in cases pending before the Supreme Court of the United States. 2 s.h. (fall). *Wallace*

Constitutional Law. The distribution of and limitations upon governmental authority under the Constitution of the United States. Included are study of the doctrine of judicial review of legislative and executive action; the powers of Congress and the President; the limitations on State governmental powers resulting from the existence or exercise of Congressional power; and judicial protection against the exercise of governmental power in violation of rights, liberties, privileges, or immunities conferred by the Constitution. 3 s.h. (fall); 2 s.h. (spring). *Van Alstyne and Wallace*

Copyright and Unfair Competition. Legal problems arising in the production, marketing, and distribution of literary, artistic, musical, and related achievements. While the course will be concerned primarily with statutory and common law copyright, it will include study of the law of unfair competition, including legal protection of trade marks and trade names, and some comparison of copyright with the law of patents and design patents. 3 s.h. (spring). *Wallace*

Criminal Law and Procedure. An introductory study of the law of crimes and the administration of criminal justice; analysis of the criminal act and the mental element in crime; consideration of specific offenses as defined by statute and the common law; discussion of typical defenses in relation to specific crimes; study of the elements of Anglo-American criminal procedure. 2 s.h. (each semester). *Livengood*

Seminar in Criminal Law. Current problems in administering criminal justice, including studies of theory and technique in criminal procedure (investigation, prosecution and defense of criminal charges), inquiry into basic policy in the use of criminal sanctions for the promotion of public order, consideration of contemporary developments (legislative, judicial and administrative) in substantive and adjective criminal law, and analysis of specific problem areas such as mental responsibility, sexual deviation, attempts, and vicarious liability. 2 s.h. (fall). *Livengood*

Seminar in Criminal Procedure. Investigation of crime and the police practices pertinent thereto, including detention and arrest, interrogation, search and seizure; exclusionary rules of evidence; motions for continuance, change of venue, and challenges to the jury; problems of the indigent defendant; discovery problems in criminal trials; post-trial appellate procedures. 2 s.h. (spring). *Everett*

Federal Jurisdiction. A study of the federal courts with respect to the part played by them in achieving a workable federalism. Special attention will be given to the original jurisdiction of the federal district courts, the relationship of the federal courts to state courts and state law, and the permissible and desirable range of federal judicial power. 3 s.h. (spring). *Paschal*

Federal Taxation I. An introduction to federal taxation for those interested in that subject and a terminal course for those who are not but seek the minimum knowledge necessary to identify a tax problem. A detailed study of the basic concepts of the income tax is followed by a survey of some specialized tax areas, such as the income tax treatment of estates and trusts, partnerships, corporations, corporate distributions and adjustments and the federal estate and gift taxes. 3 s.h. (each semester). *Lowndes*

Federal Taxation II. The principal emphasis of the course is on the federal estate and gift taxes. Consideration is also given, however, to the related portions of the federal income tax dealing with the taxation of the income of estates and trusts and income in respect of a decedent. 3 s.h. (fall). *Lowndes*

Federal Taxation III. The course is concerned principally with the taxation of corporations and corporate distributions and adjustments under the federal income tax. Among the topics considered are how corporations are taxed, the organization of a corporation, the tax treatment of corporate distributions, redemptions and liquidations, collapsible corporations, the accumulated earnings and personal holding company taxes, subchapter S corporations, and corporate reorganizations and divisions, along with a

comparative study of the taxation of partners and partnerships. 3 s.h. (spring). *Lowndes*

International Economic Relations. Legal framework of U. S. foreign trade and investment; foreign trade and investment laws of selected foreign countries; function of international economic law; international economic agreements; problems of foreign trade and investments. 3 s.h. (spring). *Baade*

International Law. A survey of public international law of peace, as evidenced especially in decisions of national and of international courts; the drafting and interpretation of treaties; the nature of handling of international claims; the organization and jurisdiction of international tribunals, with special reference to the International Court of Justice; developments with respect to the codification of the law. 3 s.h. (fall). *Baade*

Labor Relations. A study of the law relating to collective bargaining and concerted labor activities, including the National Labor Relations Act and related legislation, the legal aspects of strikes, boycotts and picketing, the negotiation and administration of collective bargaining agreements, procedures for the settlement of labor disputes, and relations between the union and individual employees. 3 s.h. (fall). *Livengood*

Municipal Corporations. State legislative creation and control of local governmental units, municipal police power, limitations on taxation, indebtedness, and expenditures of funds, bond issues, tort liability, annexation, eminent domain, subdivision regulation, public housing, and urban renewal. 2 s.h. (fall). *Everett*

Securities Regulation. A study of the federal and state securities laws and the industry they govern, with emphasis on the mechanics and regulation of the distribution process and trading in securities; subjects dealt with include the functions of the Securities and Exchange Commission, registration and disclosure requirements and related civil liabilities, "blue sky" laws, proxy solicitation and reporting requirements, broker-dealer regulation, the self-regulatory functions of the exchanges and the regulation of investment companies. 3 s.h. (spring). *Havighurst*

Seminar in Labor Law. An intensive examination of significant problems in collective bargaining, union-management relations and labor dispute settlement, with emphasis upon the drafting and interpretation of contract clauses, theories and techniques in contract negotiation, grievance handling, voluntary arbitration and other procedures for the adjustment of disputes, and the inter-relation of the legal and economic aspects of labor problems. 2 s.h. (spring). *Livengood*

Seminar in Legislation. Studies in the legislative process and in the drafting and interpretation of statutes. Included will be exercises in legislative drafting in addition to study of selected materials on such subjects as lobbying, legislative procedures, legislative investigations, legislative-administrative relations, and statutory interpretation. 2 s.h. (fall). *Paschal*

Seminar in Military Law. A study of military jurisdiction, the rights of military personnel, the body of both substantive and procedural law that has developed under the Uniform Code of Military Justice; in addition to its other goals, the seminar will seek to develop skills in statutory interpretation and to encourage comparisons between civilian and military criminal law administration. 2 s.h. (fall). *Everett*

Seminar in Regulated Industries. Selected studies of government economic regulation in such regulated industries as transportation, broadcasting, and power, plus directed research and writing in specific problems of trade regulation. (Not offered in 1966-67.)

Seminar in Urban Renewal. A study of the urban renewal program, as implemented at the federal and local levels. Extensive field work is planned and urban renewal officials will meet with members of the seminar to discuss problems of implementing an urban renewal program. 1 s.h. (spring). *Everett*

Social Legislation. Contemporary public welfare law, with emphasis on government regulation of conditions of employment, including the Fair Labor Standards Act and other wage-hour and child-labor statutes, unemployment insurance and other social security legislation, employers' liability and workmen's compensation acts, and related laws establishing minimum standards for the creation, continuance and termination of the employment relationship. In addition to other objectives, the course will seek to develop skills in legislative advocacy and procedure, and in the drafting and interpretation of statutes. 2 s.h. (spring). *Livengood*

Seminar in Tax and Estate Planning. See Property Courses, page 31, for description.

State and Local Taxation. Constitutional limitations on the taxing power; jurisdiction to tax; state excise taxes; and the general property tax. (Not offered in 1966-67.)

Trade Regulation. A study of the federal antitrust laws and their common law background, with emphasis on the economic policies involved, and of specific unfair trade practices and unlawful restraints at common law and under state and federal statutes. Attention is given to a critical examination of legislation designed to enforce competition as the primary control of the economic system; legal measures that supplement or replace competition; the relation of patents and antitrust; price discrimination; fair trade laws; regulation of advertising; trademarks and trade-names; appropriation of trade values; boycotts; and disparagement. 3 s.h. (fall). *Havighurst*

Seminar in Workmen's Compensation. The main elements of Workmen's Compensation Law of the United States are covered through the assignment of typical office problems on which legal memoranda or opinions are prepared. 2 s.h. (fall). *Larson*

Seminar in World Law. The emphasis of this course is on those aspects of national law and international law which have an important influence

on weakening or strengthening a world legal order. The course does not duplicate the material in the regular course on International Law. 2 s.h. (spring). *Larson*

Seminar in International Organizations. This course covers the principal legal questions, including current controversies, affecting the United Nations or growing out of the United Nations Charter. (Not offered in 1966-67.)

General Courses

Admiralty. The special body of law governing maritime affairs, especially the transportation of goods and passengers by water. Admiralty jurisdiction; marine insurance; carriage of goods; charter parties; general average; rights of injured seamen and others; collision; salvage; maritime liens and ship mortgages; limitation of liability; governmental activity in shipping. 3 s.h. (spring). *Wetherington*

Comparative Law. An examination and comparison of the law of selected jurisdictions on certain specific topics. The history, sources, and methods of the civil law will be investigated, discussed, and compared with those of common law countries. (Not offered in 1966-67.)

Conflict of Laws. A study of the special problems which arise when the significant facts of a case are connected with more than one jurisdiction. Recognition and effect of foreign judgments; choice of law; federal courts and conflict of laws; the United States Constitution and conflict of laws. 3 s.h. (spring). *Baade*

Equitable Remedies. A survey of equitable remedies in general (including enforcement of equity decrees) and of important parts of the fields of equity and restitution that are not covered in other courses. (Not offered in 1966-67.)

Family Law. Marriage; annulment; divorce; separation; property rights. 2 s.h. (fall). *Baade*

Jurisprudence. Discussion of some of the basic problems of classical and contemporary juristic theory, with applications to cases and statutes. Open to all graduate students, and, with the consent of the instructor, to qualified second and third year students. (Not offered in 1966-67.)

Legal History. A study of the development of fundamental English and American legal institutions, with primary emphasis upon the establishment and growth of American law from the colonial period to the present. (Not offered in 1966-67.)

The Legal Process. A study of problems in the making and application of law and of the institutions for solving those problems. This has been called a course in "working jurisprudence." It deals with major jurisprudential concepts, not in the abstract but in an attempt to put them to

work in the solution of specific legal problems. The problems cut across conventional course lines and include not only those confronted by courts, but also those confronted by private persons and their counsel, legislatures, administrative agencies, public officials, and others. (Not offered in 1966-67.)

North Carolina Statutes and Decisions. A study of selected statutes of North Carolina with discussion of their application, and an analysis of the decisions of the Supreme Court of North Carolina construing them. 2 s.h. (spring). *Bryson*

Patent Law. A short survey of the law relating to patents and trademarks, with some coverage of copyrights, primarily to give the general practitioner a foundation in these areas to collaborate effectively with specialists. Special attention is given to overlapping problems in above-mentioned areas. (Not offered in 1966-67.)

Torts. The bases of liability in damages for personal injuries and injuries to property; bases other than fault; negligence; intentional infliction of harm. Procedure in jury trials; proof of negligence; causation and "proximate cause"; defenses. Special rules applicable to occupiers and owners of land, motor vehicle accidents, suppliers of goods and remote contractors. Misrepresentation and fraud; defamation; assault and battery; false imprisonment. 3 s.h. (fall); 2 s.h. (spring). *Hardin*

Procedure and Practice Courses

Civil Procedure. A study of the adjudication of civil cases with special emphasis on the Federal Rules of Civil Procedure. 3 s.h. (each semester). *Paschal*

Evidence. A study of the common-law rules of evidence, including the requirements of relevancy and materiality; competency and privilege of witnesses, examination and cross-examination, burden of proof and presumptions, judicial notice, and functions of judge and jury. 3 s.h. (fall). *Strong*

Legal Profession. Lectures, discussions, and reading concerning the ethical problems and professional responsibilities of the lawyer. 1 s.h. (spring). *Hardin*

North Carolina Practice. A study of the steps in a civil action at law from the issuance of process to the entry of final judgment including service of process; appearance and waiver of process; selecting the jury; various motions made during the trial; submission of case to jury; verdict; judgment; noting and perfecting appeal. Also included are such topics as jurisdiction of various courts in North Carolina; venue; trials without a jury; provisional remedies and special proceedings. 2 s.h. (fall). *Bryson*

Trial Practice. A study of the function of the advocate in the trial of law suits, with emphasis upon methods of pre-trial preparation and development of facts in court, typical uses of rules of procedural and substantive law in trial proceedings, and tactical and ethical aspects of problems which confront the trial lawyer. The course is open to third-year students who have completed the course in Evidence. 2 s.h. (spring). *Hardin and Strong*

Legal Research and Writing

Duke Law Journal. One semester-hour of credit shall be accorded for each semester of satisfactory *Law Journal* activity as a competitor or as a member of the Editorial Board other than an officer; two semester-hours of credit shall be accorded for each semester of satisfactory *Law Journal* activity as an officer of the Editorial Board.

Research and Writing. Classroom instruction and individual problems in the use of law books, the preparation of memorandum of law, and moot court briefing and argument. 1 s.h. (each semester). *Johnston*

Upon recommendation of the Committee on Graduate Study, seminars not listed in the Bulletin may be created or arrangements made for supervision of special research by individual graduate students in any subject.

All matters presented in this Bulletin are subject to change as the University or the School of Law may deem expedient.



School of Medicine and
Medical Center
1966



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General Information

In 1924, James Buchanan Duke established The Duke Endowment, and thus made possible the creation of Duke University.

"I have selected Duke University," he said, "as one of the principal objects of this Trust because I recognize that education, when conducted along sane and practical, as opposed to dogmatic and theoretical lines, is, next to religion, the greatest civilizing influence."

One year later, and ten days before his death, Mr. Duke added the sum of ten million dollars to The Duke Endowment for the creation of a medical school, hospital, and nurses' home at Duke University. At that time he wrote: "I have selected hospitals as another of the principal objects of this Trust because I recognize that they have become indispensable institutions."

The organization, development, and direction of the new Medical Center was entrusted to an outstanding medical scientist and educator, Dr. Wilburt C. Davison, who was appointed the first Dean of the School of Medicine.

Selection of an outstanding faculty was of primary importance. After careful consideration, the Medical Center elected to follow the examples set by Ford Hospital and Vanderbilt in the methods of selecting faculty. It was also decided to follow Osler's dictum of keeping the average age of the faculty under thirty-five years. Invitations to become professors at Duke University Medical Center were then extended to residents of various services at the Johns Hopkins University Medical Center.

Construction of the Medical Center began, based on the collegiate Gothic plan which had been approved by Mr. Duke before his death.

Wards and clinics were named for eminent physicians and surgeons in order to remind the staff and students of what has been accomplished in medicine, as well as to follow Mr. Duke's Indenture: "I advise courses in history, especially the lives of the great of the earth."

The Council on Medical Education and Hospitals of the American Medical Association gave Duke Class A approval in 1929 before the faculty and buildings were completed.

Announcements were then inserted in college papers that applications for the study of medicine, nursing, dietetics, hospital administration, and other health professions would be considered in 1930.

Duke Hospital was opened for patients on July 21, 1930. The first students in hospital administration were admitted on July 1, 1930; the first dietetic student on August 15, 1930; the first medical students (1st and 3rd year) on October 2, 1930; and the first student nurses on January 2, 1931. The schools and hospital were dedicated on April 20, 1931.

On the advice of Dr. Harvey Cushing and Dr. Henry A. Christian of Harvard, most of the faculty were appointed on "geographic" full time, so that private patients could obtain as good medical and surgical care as that given to the charity patients. Therefore, on September 15, 1931, the Private Diagnostic Clinic (PDC) was organized to improve the facilities for private patients, especially for those of moderate means.

Soon other additions became necessary, as students, faculty, and patients increased in numbers. The Baker House (originally for nurses, 1932) and the PDC wing (June, 1940) were provided by The Duke Endowment and Duke University. The W. B. Bell Research Building was started in 1940 with funds from the PDC, the Rockefeller Foundation, the Dorothy Beard Research Fund, and The Duke Endowment and was expanded by funds from the National Institutes of Health, the Markle Foundation, and Duke University. The Erwin Road Nurses' Dormitory (now Hanes House Annex) was built (1943) with funds from The Duke Endowment and the U. S. Public Health Service. The Elizabeth P. Hanes House for Nurses (1950) was a gift from Mrs. Frederic M. Hanes, with additional funds from the N. C. Medical Care Commission. The North Carolina Cerebral Palsy Hospital, which is directed by Duke, was dedicated on March 30, 1950. The Durham Veterans Administration Hospital, which is affiliated with Duke, was completed and dedicated in 1953. The W. S. Rankin Out-patient and PDC wing (1954) were financed by the PDC, The Duke Endowment, and the N. C. Medical Care Commission. The Geriatrics and the Diagnostic and Treatment wings (1963) were built with funds from the National Institutes of Health, the PDC, and The Duke Endowment.

Today, Duke University Medical Center continues to strive to lead and not lag the contemporary medical scene. This involves maintaining superiority in its four primary functions: unexcelled patient care, dedication



to its educational programs, national and international distinction in the quality of its research, and service to the region.

Growth is identified with a deeper involvement in the social aspects of health, the establishment of many advanced therapeutic and research facilities, a building program that will require one or more decades for its completion, and a new and imaginative revision of the medical teaching program that has attracted the attention of educators across the globe.

In the years to come, Duke University Medical Center will continue to adapt, experiment, and innovate in all aspects of its functions, basing changes upon its traditions and upon its aspirations for service to mankind everywhere.

Courses of Study and Degrees Offered

The New Medical Curriculum

In recent years, analysis and appraisal of the curriculum in medical schools has caused changes in many. Several factors have required these changes, important among them being the increasing scope and complexity of medicine generally, and the dissatisfaction with the sharp cleavage between basic science and clinical years. As a result of long study, the Duke University School of Medicine instituted a major revision of the curriculum beginning with the class starting in the Fall of 1966.

The aims of the new curriculum are: (1) to provide a strong academic basis for a lifetime of growth within the profession of medicine, with the development of technical competency, proficiency, and the proper attitudes peculiar to the practice of medicine as well as appreciation of the broader social and service responsibilities; (2) to establish for the first year a basic science program which will fulfil the purposes of the increasingly heterogeneous student body; (3) to offer both clinical and basic science education simultaneously; (4) to permit the student to explore his personal intellectual preferences and capabilities; (5) to allow study in depth in selected areas, either clinical or basic science; (6) to provide greater freedom of course selection and thus to encourage earlier career decision; and (7) to achieve better

integration of the medical school curriculum with residency training and the practice of medicine.

The curriculum, while offering a previously unattainable degree of flexibility to medical education and new opportunities for intellectual exploration, also makes heavy demands upon the student. It should be recognized that a medical student at Duke University School of Medicine is expected to maintain a consistent level of attainment and to demonstrate qualities of initiative and dedication to his chosen profession. A scholarly attitude to medicine that will continue throughout an entire career is an important objective of the medical school. The foundations of this attitude to learning should accompany the student when he enters.

It is expected that students will dedicate daily several hours to private study, utilizing the resources available in the Medical Center library and those provided by themselves and by other facilities of Duke University. During the University term, private study should also occupy part of each weekend.

The new curriculum calls for major contributions of independent effort and individual initiative from the first day of medical school onward. Members of the medical school faculty should be regarded not as the teachers of didactic information but as guides to learning, whose opinions may be questioned in sincerity.

A student is expected to maintain at all times a professional attitude toward patients, to respect confidences and to recognize that he is the recipient of privileged information only to be discussed within the context of scholarship and in circumstances that truly contribute to the educational process or the care of the patient. This attitude involves consideration not only of speech and dress but also of morality, honor, and integrity.

A special examination will be taken annually by all medical students enrolled in the new curriculum. The examination, comprising two 3-hour papers, is administered on a single day each year, shortly preceding Part I of the National Board Examinations. Freshmen medical students take this examination on the second day of medical school, in addition to subsequent examinations in June. Grade weighting is attached to these examination results and will be recorded in each student's record.

Doctor of Medicine Degree

The degree of Doctor of Medicine is awarded upon approval by the faculty of Duke University to those students who have completed the curriculum of the School of Medicine to the satisfaction of the Medical School Advisory Committee, and who have demonstrated their fitness to practice medicine by adherence to a high standard of ethical behavior and

morality and paid or made satisfactory arrangements to pay all indebtedness to the University.

Course Requirements

First Year

The student will study the basic principles of all the preclinical disciplines. Rather than mastering an encyclopedic array of facts, the purpose will be to acquire familiarity with the major principles of each subject. As an introduction to medicine, physical diagnosis, and clinical microscopy will be presented by the clinical services. The year will be divided into two terms, each of eighteen weeks, as follows:

<i>Term I</i>	<i>Hours</i>
Anatomy	252
Biochemistry	205
Physiology	205
Human Behavior	49
Free Time (Study, etc.)	90
	801

<i>Term II</i>	<i>Hours</i>
Pathology	235
Microbiology	168
Pharmacology	139
Human Behavior	11
Physical Diagnosis	54
Genetics	36
Clinical Microscopy	54
Free Time (Study, etc.)	104
	801

Second Year

The second year will provide an exposure to all of the major clinical disciplines permitting the student early in his career to become a participant in the care of patients. The acquired appreciation of the problems of the clinical areas and the opportunities to recognize the applications of the basic sciences should lead to a more meaningful selection of courses for the subsequent two years. The second year will be divided into five terms of seven weeks each as follows:

Medicine	7 weeks
Obstetrics	7 weeks
Pediatrics	7 weeks
Psychiatry	7 weeks
Surgery	7 weeks
Community Health Sciences	70 hours

Third and Fourth Years

These two years will be made up of elective courses, as flexible as possible within requisite limitations. Each student will have two advisors, one from the preclinical and one from the clinical faculty. These advisors, with the Office of the Dean, will assist the student in formulating his program for the third and fourth years. Maximum and minimum course load requirements will be established. Approximately one-half the time will be spent in basic science and one-half in clinical science. The student will be advised to spend substantial time in medicine and surgery. Completion of the Medical Research Training Program may fulfil the requirements for basic science.

The elective courses of study offered are described under each department. The combinations are too varied to be enumerated. The wide selection, however, affords an opportunity for each student to design his program to satisfy best his needs in conformity with his medical future.

As an alternative after completion of the second year, the student may enroll as a Ph.D. candidate in one of the basic sciences, earning this degree in two or three years. Then, having completed three of the four years necessary for an M.D., he may earn the M.D. degree by completing a fourth clinical year.

The third and fourth years will be divided into four quarters of nine weeks each. Certain courses as noted will be offered during the summer term.

Promotion

The records of each student in the first and second years are reviewed periodically by promotion committees, which are made up of the department chairmen. The Medical School Advisory Committee acts on recommendations from these promotion committees and may:

1. Promote to the next year those students whose work is good.
2. Warn those students whose work is less than good that they must improve their scholastic endeavor.
3. Place on probation those students whose work is poor.
4. Request the resignation of any student who is considered an unpromising candidate for the degree of Doctor of Medicine.

A student wishing to appeal this decision may do so to the Dean within two weeks of his notification.

The Dean, with the advice of the Medical School Advisory Committee, reserves the right to require the withdrawal of any student at any time if, in the opinion of the majority of committee members, he should not continue his course.

At the end of the second year, each student will be required to take Part I of the National Board Examinations.

Bachelor of Science in Medicine

The degree of Bachelor of Science in Medicine is conferred upon those students who have fulfilled the following requirements: (1) completed two academic years at the Duke University School of Medicine with performance in all courses at the level of "Good" or better; (2) received approval of a research program to be conducted under the sponsorship of a faculty member and with the consent of the head of the department in which the work is to be done; (3) received written permission from the Assistant Dean for Medical School Affairs before beginning the program; (4) completed creditable, original investigative work of his own under the supervision of an advisory committee of which the faculty sponsor will be chairman and appointed by the chairman of the appropriate department; (5) completed a written report of the investigation, in the form of a thesis in the format meeting the requirements of the Graduate School of Arts and Sciences, which has been accepted by the advisory committee following an oral examination; and (6) submitted two bound copies and one unbound copy to the Assistant Dean for Medical Student Affairs not later than February 1 prior to the anticipated date of graduation with the M.D. degree.

No credit toward this degree is given for additional college work. All students in good standing are encouraged to undertake work towards this degree in addition to their work toward the degree of Doctor of Medicine. Application should be made to the Office of the Assistant Dean for Medical Student Affairs for guidance in establishing the program and for aid in fulfilling these requirements.

Medical Scientist Training Program

Combined M.D.—Ph.D. Training Program

General Information

The Medical Scientist Training Program is conducted under the auspices of the School of Medicine and the Graduate School of Arts and Sciences and is designed for highly qualified students strongly motivated toward a career in medical sciences. It will provide them with the opportunity to obtain a graduate education in one of the medical sciences while providing exposure to clinical medicine. The program will require

six to seven years of study and will lead to both an M.D. and a Ph.D. degree. While the emphasis of this program is on basic medical science, the students, because of their clinical training, will have open to them a remarkable range of career opportunities. It is probable that the graduates of the Program will follow one of two broad paths. Some will embark directly on careers in teaching and research in one of the basic medical sciences, hopefully having acquired some understanding of clinical medicine in this Program. Others will enter residency programs with a background of experience in basic science which will allow them to pursue research careers in clinical medicine without the frustrations due to inadequate training in the basic medical sciences.

Eligibility

Applicants must meet the requirements for admission to both the Medical School, as a candidate for the M.D. degree, and the Graduate School of Arts and Sciences, as a candidate for the Ph.D. degree. It is anticipated that most of the candidates will apply for admission as a first year student, but applications will be accepted from students who are in residence.

In addition to the minimum requirements established by the prior acceptance into the Medical School and the Graduate School, additional course work in science and mathematics as well as previous research experience will count heavily in the selection of candidates.

Financial Support

Those students accepted will be offered a traineeship award (MSP trainee) which will include a stipend plus a full tuition allowance. The stipend levels are equivalent to the current U.S. Public Health Service predoctoral and postdoctoral fellowships, and an MSP trainee will be supported until he has completed both degrees, as long as his progress is satisfactory. These stipends include a dependency allowance of \$500.00 per dependent. The stipend levels for a seven-year program begin at \$2,400.00 with yearly increments to \$6,000.00 per year, plus any dependency allowance.

Candidates may also participate as students in the Medical Scientist Training Program without receiving one of the special traineeship awards. Details of the alternate awards will be discussed with candidates on an individual basis.

The Training Program

This program has been designed to offer the student great latitude in the selection of his course material, but the basic requirements will be those described in the following example of a typical program. In a typi-

cal program, the first two academic years are the core basic science year and the core clinical science year of the new curriculum for medical students at Duke University. At the completion of the second year, the student enters the graduate program. Following the completion of the requirements for the Ph.D., the student needs one more academic year of clinical training to complete the requirements for the M.D. degree.

Year 1—Core Basic Science Year. This year is made up of core material in the basic sciences of Anatomy, Biochemistry, Genetics, Microbiology, Pathology, Pharmacology, and Physiology, in addition to an introduction to clinical methods. The students in the Medical Scientist Training Program will work together throughout this first year and will have an opportunity to interact fruitfully with one another as well as with the advisors assigned to this group. At the end of this first year, the student will be familiar with each of the basic sciences and will be in a good position to select his field of graduate study. The summer following the first year can be used in one of two ways: one, the student may spend this time taking additional background courses in mathematics, chemistry, or other fundamental sciences; or two, he may elect to begin his graduate study and/or research.

Year 2—Core Clinical Science Year. A comprehensive approach to medicine, oriented to the patient as a whole, will be the basis for the second year curriculum for the medical scientist. During this year, which represents the student's first introduction to clinical medicine, the focus will be upon the total human biological unit rather than upon separate organ systems. The curriculum will be "vertically" integrated, multidisciplinary, and interdepartmental. Stress will be placed upon the continuity of biological processes—from conception through birth, development, and maturation to senescence and death. Special consideration will be given to the pattern of this developmental sequence in the individual, and to the changes in the pattern determined by genetic composition and by alterations brought about through the action of the particular environment in which the patient lives.

During this year the trainee will be primarily taught by one specific group of teacher-investigators from the clinical departments. The program will consist of a special series of seminars and demonstrations plus clinical experience. The clinical experience will parallel the seminar series insofar as possible. For convenience in description, these clinical experiences have been roughly divided into periods. In practice, the entire year will be organized as a unit both in the seminar and the clinical work.

The initial six weeks will be devoted to Obstetrics and Gynecology, with its considerations of the adult woman, sterility and infertility, conception, maternity, and birth. Two weeks will then be given to a combined interdisciplinary effort between the Departments of Pediatrics and

Obstetrics in the area of maternal fetal interaction, birth, and the perinatal period.

The next six weeks will be devoted to Pediatrics, with emphasis upon normal development and the aberrations caused by disease. Time will then be allotted to a combined effort of all departments in the area of adolescence, including such social problems as juvenile delinquency.

Medicine, Surgery, and Psychiatry will cooperate in the teaching program during the last 21 weeks of the year. Selected patients from these services will be maintained on a "mixed" ward to facilitate and improve this phase of the student's clinical experience. The different types of patients also provide an excellent opportunity for psychologists, social workers, and others to demonstrate the importance of their respective disciplines and attitudes for these patients. Finally, during the terminal weeks of the year, the student will be given the opportunity to appreciate the problems of senescence and the impact of chronic disease upon the individual and his family.

Years 3, 4, and 5—The Graduate Years. During the third, fourth, fifth, and, if necessary, the sixth year of the Program, the student will pursue graduate study in order to satisfy the requirements for the Ph.D. degree. These requirements include: (1) completion of the necessary coursework, (2) adequate performance in the preliminary examination, (3) original research suitable for a dissertation, and (4) successful defense of the thesis in the final examination. Detailed description of other general requirements for the Ph.D. degree (e.g. competence in two foreign languages) are set forth in the *Bulletin of the Graduate School of Arts and Sciences*. The standards of performance during this period will be determined by the individual departments concerned. Further details concerning the individual departments may be obtained by writing to the Director of Graduate Studies in a given department.

The graduate curriculum of each student will be worked out in consultation with the Director of Graduate Studies of the department in which the student chooses to work and will require the approval of the Medical Scientist Training Committee. Since most of the ordering ideas and experimental techniques of all of the medical sciences derive from mathematics and the physical sciences, it is essential to ensure that all students in the program have an adequate grounding in these subjects. Because of the close working relationship and geographical proximity of the medical sciences and physical sciences departments at Duke, the setting is unusually favorable for the achievement of that goal.

If the student has not completed a study of differential and integral calculus, including one course in differential equations, he will be required to do so early in his graduate career. This also holds for students who have not had a rigorous course in Physical Chemistry. In addition to the aforesaid courses which are recommended for all students in the Program, selected students, depending upon their interests and talents,

will be encouraged to take additional course work in the Departments of Mathematics, Physics, Chemistry, and Electrical Engineering.

Descriptions of graduate courses in the Departments of Anatomy, Pathology, Microbiology, Biochemistry-Genetics, and Physiology-Pharmacology are listed in the *Bulletin of the Graduate School of Arts and Sciences*. Students will be encouraged to select courses which are relevant to their own developing individual interests rather than according to a prescribed program which is applied to all students in a given discipline. It is our view that such range, flexibility, and freedom are the essence of graduate education.

The original research and dissertation of each student will be supervised by a faculty advisor chosen by the student in consultation with the director of graduate studies in his department. It is not required that the faculty advisor be a member of the department in which the student will take his degree. For example, a student in the Department of Biochemistry could choose an advisor in the Department of Microbiology; a student in the Department of Physiology, an advisor in the Department of Zoology, and so on, provided that the plan meets with the approval of all concerned. The faculty advisor is the chairman of the student's supervisory committee which must consist of at least three members of the major department. This committee generally administers preliminary (before commencing original research) and final (after completion of dissertation) examinations for the student.

Terminal Year—An Elective Year in Clinical Science. The student will be assigned an advisor from the clinical department in which he is most interested. Together they would construct a highly individualized training plan for that particular student and one that would have a major emphasis relative to the chosen clinical area as well as a minor emphasis in one other field. The integration of research and clinical experience will be carried out in such a way that the student's research competence will be facilitated rather than lost. Therefore, this year will be planned with due regard to the trainee's proposed career in research. This year would give the trainees in the Medical Scientist Training Program further training in clinical medicine and would complement the second or core clinical year, so that the trainee's total clinical experience would approximate that now given in the regular clinical years of medical school (the third and fourth years in the majority of schools). It should be noted that since these students will receive the M.D. degree upon completion of this final year, great care will be taken by the faculty to insure that the student will be well grounded in the present day concepts of patient care.

Parenthetically, it is hoped that the student's last year would give the student an experience which will not be repeated later during his internship. Rather it should serve to complement these phases of his training. Ideally, the future surgeon, for example, should be exposed to fields other than surgery, since he will receive intensive training in surgery during

his residency. The student usually will be tempted to enter immediately upon the area of his primary interest (e.g. surgery). It is partially to offset this tendency that it is stipulated that a student should take a major and minor subject and that the final-year program should be arranged through consultation by the student with his faculty advisor.

Application and Admission Procedures

1. Complete the application form for the Duke University School of Medicine.
2. Complete the application form for the Medical Scientist Training Program.
3. After preliminary screening, selected candidates will be asked to submit an application to the Graduate School of Duke University.
4. A member of the Medical Scientist Training Committee will be available to furnish further information to applicants interviewed at Duke. Applicants will be notified of their status not later than January 10.

Application forms and further information can be obtained by writing to: Associate Director, Medical Scientist Training Program, Department of Pathology, Box 3712, Duke University Medical Center, Durham, North Carolina 27706.



Resources for Study

Medical Center Library

The Medical Center Library, located in the Davison Building, attempts to provide all services and collections necessary to further educational research, and clinical activities in the medical field. Extensive reference and bibliographical services are provided. The collection exceeds 70,000 volumes and 1,500 current periodicals are being received, and over one hundred are in duplicate subscriptions.

The Trent Collection in the history of medicine is an unusually fine one, rich in manuscripts and rare books, and providing opportunity for study and research as well as casual reading in the field. *Director G. Cavanagh; P. Karcz, C. McDaniel, W. Bird, M. Brown, M. Hutt, K. Thompson*

Duke Hospital

Duke Hospital is an integral part of the Medical Center and currently has 650 beds and 30 bassinets. The hospital performs the dual functions of professional education and patient care. Comprehensive diagnostic and treatment facilities are provided. Different levels of patient care are provided, ranging from the intensive nursing unit, through the conventional nursing sections to a minimal care unit. Private, semiprivate, and

ward accommodations are available. Over 20,000 patients are admitted each year. The approximate daily census by service is as follows: Surgery, including the surgical subspecialties, 250; Medicine, 160; Pediatrics, 55; Psychiatry, 45; and Obstetrics-Gynecology, 45. Surgical facilities include 18 operating rooms where over 15,000 surgical procedures are performed annually. Two obstetrical delivery rooms are maintained. Special diagnostic and treatment units are also available such as the recovery room, cardiac catheterization laboratory, and hyperbaric oxygenation chamber.

The outpatient services comprise the public clinics, the private patient clinics, the employee health office, and the emergency service. Over 230,000 visits are made each year to these units. Close working relationships between Duke Hospital and various outside health agencies enhance continued care of the patients.

The clinical faculty of the Duke University School of Medicine forms the medical staff of Duke Hospital. Thus, this group not only participates in both undergraduate and graduate medical education but also in active medical practice within the hospital and the private diagnostic clinics. Duke Hospital is approved for internship and residency training by the Council on Medical Education and Hospitals of the American Medical Association and conducts an active educational program involving approximately 300 housestaff members. The hospital is fully accredited by the Joint Commission on Accreditation of Hospitals.

Veterans Hospital

The Durham Veterans Administration Hospital is located within walking distance of the School of Medicine. The full-time professional staff are all members of the faculty of Duke University School of Medicine. This 489 bed general hospital provides an opportunity for closely integrated student teaching and housestaff training.

Teaching and Research Facilities

Classroom and laboratories for clinical teaching are located throughout the Duke Hospital patient areas. The major preclinical teaching facilities are in the Medical School Unit, the Davison Building, which is physically a part of the hospital. Additional teaching and research facilities are located in the Diagnostic and Treatment Building, the Gerontology Building, the Clinical Research Building, and the William B. Bell Research Building. All except the latter are a part of a single building complex.



Central Television Facility

The functions of this unit include television service directed toward the instruction, research, and patient care programs of the Medical Center. Another function is that of conducting continuing research in evaluation studies and in the development of television utilization. A collection of videotaped material is available as cores for teaching presentations. The television system is designed to enhance the multimedia approach for instruction. The television control center is capable of interdigitation of all audio and video signals originating from TV cameras, a motion picture opaque-slide pick-up device, and videotape recorder. Mobile cameras, monitors (receivers), and the wide-screen TV projector may be used in 21 specific locations throughout the Medical Center. These locations include all major classrooms. With the use of extension cables, other locations may be reached. Four-channel capability is a built-in feature of the system. Although no formalized study in educational television is provided, individual training programs are available for those who wish to pursue medical television as a career. Consultation and training programs are designed for those who wish to utilize television in their professional activities. *S. Agnello, Coordinator*

Student Life

Living Accommodations

Housing

Men enrolled in the School of Medicine may apply for room accommodations in the Men's Graduate Center, which is located within a block of the Medical Center. The rooms are furnished for two persons.

Women enrolled in the School of Medicine may apply for accommodations in Epworth Hall on the Woman's College Campus and in Hanes Annex on the West Campus.

Married medical students may apply for accommodations in the Duke University Apartments. These consist of efficiency, one- and two-bedroom apartments which are available to married graduate students. The apartments are complete with basic furnishings. Heat, electricity (except for window fans and air conditioners), hot and cold water, garbage and trash collection, and maintenance of grounds are included in the rental charge. (See section on Housing in chapter "Financial Information" for further information.)

Applications

Students officially accepted for admission to the School of Medicine will be requested to complete a housing information form to be returned to

the Director of Admissions, Duke University School of Medicine, Durham, North Carolina.

On receipt of the completed forms, students will be sent appropriate literature, housing application forms, and detailed instructions. The completed housing application forms and required \$25.00 deposits must then be sent to the Director of Housing, Duke University, Durham, North Carolina.

Confirmation of room and apartment assignments will be forwarded to the applicants on or before August 1. (See section on Housing Deposit and Refund in chapter "Financial Information.")

Room Regulations

Rooms are rented for the academic year. Room rentals for less than one term require special arrangements.

A resident student in order to retain his room for the succeeding academic year must make application at the Office of the Housing Bureau for confirmation of his reservation.

No refund of room rent will be made after the day of registration, except for involuntary withdrawal to enter the armed services. Such refunds will be made in accordance with the University's established schedule.

The authorities of the University do not assume responsibility for persons selected as roommates, and each student is urged to select his roommate when reserving a room. Any student who occupies a double room without a roommate will be given written notice from the Housing Bureau to obtain a roommate or he may be required to pay the rental consideration for the whole room.

Any exchange of rooms must be made at the Housing Bureau. Persons who exchange rooms without the approval of the Housing Bureau will be subject to the charge for both rooms.

Regulations governing the occupancy of rooms will be supplied by the Housing Bureau to those students who make application for housing. Occupants are expected to abide by these regulations.

Apartment Regulations

The Duke University Apartments are rented on a lease basis for specific periods. Policies for assignment, details of facilities provided, and other pertinent information concerning the apartments will be sent to each applicant who indicates a desire for an apartment.

Dining Facilities

Several dining facilities, located near the medical center, are available to students in the School of Medicine.

In the Duke University Union Building, there are three cafeterias offering multiple-choice menus and a dining area, the Oak Room, which offers full meals and *à la carte* items.

In the Men's Graduate Center, there is another cafeteria with multiple-choice menus and the Coffee Lounge, where sodas and sandwiches are served from 11:30 A.M. to 11:00 P.M. (See section on Dining Facilities in chapter "Financial Information" for approximate food costs.)

Services Available

Student Advisory Program

The development of an informal and cordial student-faculty relationship is an important objective of the Duke University School of Medicine. As a means of achieving this objective, the Student Advisory Program was established.

The Student Advisory Program provides each medical student, from the time he enters as a freshman until the time he graduates as a physician, with a single faculty member whose special interest he becomes. Each student joins with four others in constituting a group for which their faculty advisor has responsibility. The student has some freedom of choice in selecting his advisor, and information is provided each freshman student with the names and professional and personal interests of those faculty members who will be joining the program that year.

Through informal meetings, discussions, and occasional social gatherings, an atmosphere of mutual confidence and friendliness becomes established, a relationship that often extends beyond graduation and reaches far into the future.

In the sophomore year, a second faculty member, whose interests complement those of the student's advisor, will assist the student in the definition of his career interests and in the selection of courses for the third and fourth years of his medical education.

Student Medical Care

With the exceptions to be noted, full medical and surgical care is furnished to all regularly matriculated medical students of the University who have paid the quarterly general fee. This service is under the direction of the Physician-in-Charge with the cooperation of the staff of the Duke University Medical Center. It includes hospitalization (limited to thirty days), medical and surgical care, drugs, dressings, x-ray studies, and ward but not special nursing. A charge for board is made at the same rate as in the University dining halls. Refraction of eyes and treatment of teeth and of all chronic and pre-existing conditions, such as

diseased tonsils, hernia, elective surgery, chronic skin conditions, and endocrine disturbances, or accidents or illnesses occurring during vacations or while off the campus are not included in this service. The cost of any necessary braces and orthopaedic appliances, as well as of special nursing, must be borne by the patient. If the student has insurance providing hospitalization, surgical, or medical benefits, the benefits shall be applied to the cost of his medical care. *E. Persons, Director of Student Health*

Student and Professional Organizations

Student Government Association

The Student Government Association is composed of fifteen elected members of the student body, three officers, and three representatives from each class. The responsibilities of the SGA include orientation of the freshmen, continuation of the Big Brother Program for freshmen, publication of the yearbook for the Medical School, participation in the Davison Scholar Program, and organization of social events, as well as representation of student views and opinions on various subjects to the faculty and administration.

A major responsibility of the SGA is the preservation of the Honor Code which has been a proud tradition at Duke University School of Medicine for many years. The prevailing opinion has been that if a student cannot withstand the relatively minor stresses and temptations arising during his medical education, he could never be expected to act with integrity under the much greater demands and responsibilities of the practice of medicine. Thus, a strong honor system exists to develop and maintain honest habits while we are learning our medical habits. Each student on entering Duke University School of Medicine is required to sign a statement expressing his understanding and familiarity with the honor system. The Student Government Association serves as an Honor Council to try any infringements of the Honor Code. The Dean's committee of students, faculty, and administration serves to recommend the disposition of a student found guilty by the Honor Council.

The Duke SAMA Chapter

Representing 75 per cent of the medical student body, the Duke Chapter of the Student American Medical Association is a service organization interested in a wide spectrum of activities. The Student American Medical Association is a national organization which represents the opinions and desires of the future physicians of America.

Chartered only recently, the organization has earned a reputation for

its interest in medical recruitment, in conjunction with the Admissions Committee, a summer externship program, a directory of the medical center, a listing of research opportunities for medical students, and many other service projects. The Duke Chapter has been very active in the national organization.

Alpha Omega Alpha

Membership in Alpha Omega Alpha is the highest scholastic honor that a medical student can achieve. Its roster of membership consists chiefly of those who, during their period of fundamental training, have attained the highest grade of scholarship in their respective classes and whose character and professional promise at the time of graduation make their teachers and fellow students confident of their future careers in the field of medicine.

The Christian Medical Society

The Christian Medical Society is an organization of students, interns, residents, and faculty members who recognize the importance of the spiritual as well as the physical aspect of the patient and have banded together in bi-monthly meetings to emphasize the importance of combining these elements for the excellence of medical practice. The moral and spiritual responsibilities of the physician are challenged by small devotional groups and the variety of outside visiting speakers of the organization. Emphasis is placed on high scholarly standards as well as personal spiritual life. Such topics as "The Implication of the New Sex Morality," "Medical Case Studies Requiring Ethical Decisions," "The Doctor as a Counselor," and "Christian Implications of Recent Trends in American Medicine" maintain a highly sensitive spiritual physician and defend against mediocrity in medicine.

Duke University Medical Alumni

The Duke Medical Alumni now number over 4,600. Membership includes all graduates of the Medical School (total through 1965 was 2,327), past and present faculty, and all past and present house-officers of Duke Hospital, including the 2,298 who are not Duke graduates, which makes a grand total of 4,625. Associate membership is held by alumni of the following: Hospital Administration, Dietetics, Social Service, Laboratory Technique, X-Ray Technology, Physical and Occupational Therapy, Medical Record Library, and Medical Art and Illustration.

Officers

Dr. Joseph M. Van Hoy '38, *President* (Charlotte, N.C.)

Dr. L. Everett Sawyer '39, *Vice President* (Elizabeth City, N.C.)

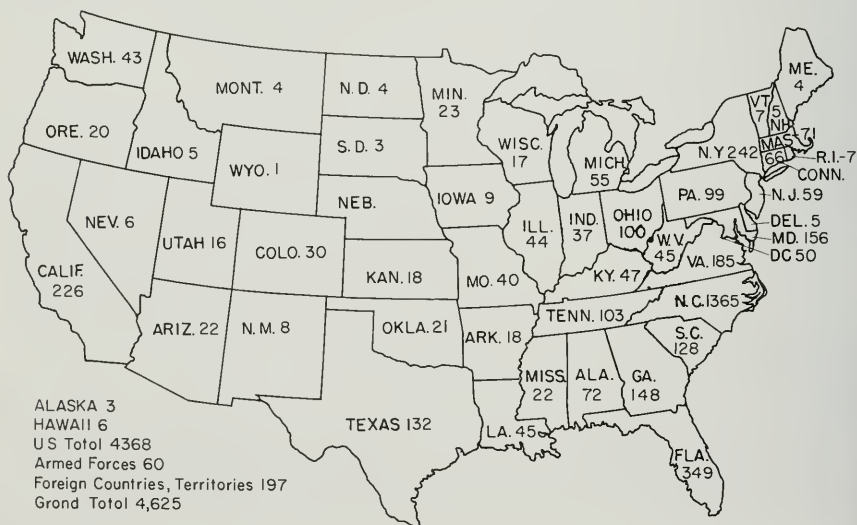
Dr. Talmage L. Peele '34, *Secretary* (Duke Medical Center)

Dr. George J. Baylin '37, *Treasurer* (Duke Medical Center)

A newsletter is sent to all the members in January, April, July, and October of each year. Reunions are held every year in Durham; the next is planned for 1966. Alumni groups have been formed in several states. Alumni luncheons or dinners are held during the following meetings: The American Medical Association, The Southern Medical Association, The North Carolina Medical Society, and the American Academy of Pediatrics.

The map shows states in which Duke Medical Alumni are located and the number in each state. Figures include those who received the M.D. degree from Duke and also those who have served a year or more on the housestaff. A total of 4,368 physicians are distributed throughout the United States.

There are also 197 Duke Medical Alumni serving in the territories of the United States and in foreign countries, and 60 alumni are on duty in the Armed Forces overseas. The countries and territories in which they are located are as follows: Afghanistan, one; Algeria, one; Australia, one; Belgium, three; Brazil, seven; Canada, thirty-one; Chile, seven; Colombia, ten; Cuba, three; Egypt, one; Ethiopia, one; Formosa, nine; France, three; Germany, three; Greece, one; Guatemala, six; Iceland, three; India, four; Indonesia, one; Iran, three; Iraq, one; Ireland, one; Italy, two; Jamaica, B.W.I., one; Japan, twenty; Jordan, two; Korea, four; Lagos, one; Mexico, seven; Nigeria, one; Norway, two; Pacific Islands, one; Panama, one; Paraguay, one; Peru, two; Philippine Islands, eight; Puerto Rico, four; South Africa, one; Sweden, four; Switzerland, two; Thailand, six; United Kingdom, twenty-one; Venezuela, four; and Virgin Islands, one.



Financial Information

Fees and Expenses

Tuition and Fees

Listed below is a table of the approximate expenses for the normal four term academic year of the School of Medicine:

Tuition and fees	\$1612.00
Board	600.00
Room	320.00
Books	135.00
Laundry	100.00
Insurance, instruments, and incidentals*	160.00
Total	<u>\$2927.00</u>

One fourth of the total fees is payable by the Friday preceding each nine-week term. A fine of \$5.00 is charged for late registration after this time. No credit will be given for any term in which the tuition has not been paid, whether the work has been done here or elsewhere.

* Microscope, sphygmomanometer, ophthalmoscope, otoscope, and other equipment which are required of each student and which must conform to rigid standards may be purchased from the University by means of a Student Equipment Time Payment Plan.

A student is not eligible to attend classes or to make use of University facilities if he is in default of payment of monies owed to the University.

Bills for fees and tuition are rendered by the Office of the Bursar, Duke University. However, nonreceipt of a bill does not exonerate the student from payment or from assessment of fine for late registration.

It is not advisable for students to attempt outside work to defray their expenses during the academic year.*

Living Accommodations

Housing

Men enrolled in the School of Medicine may apply for room accommodations in the Men's Graduate Center, which is located within a block of the Medical Center. The rooms are furnished for two persons. The rental charge per person for a double room is \$320.00 for the academic year, or \$160.00 for the 18-week term, or \$80.00 for the 9-week term, or \$64.00 for the 7-week term.

Women enrolled in the School of Medicine may apply for double room accommodations in Epworth Hall on the Woman's College Campus and Hanes Annex on the West Campus. The rental charge per person for a double room in these residence halls is \$345.00 for the academic year, or \$172.50 for the 18-week term, or \$86.25 for the 9-week term, or \$69.00 for the 7-week term.

Applicants may apply for single rooms, and these will be assigned if available; however, single rooms are usually reserved by present occupants returning for succeeding academic years.

Married medical students may apply for accommodations in the Duke University Apartments. These consist of efficiency, one- and two-bedroom apartments which are available to married graduate students. The two-bedroom apartments are assigned on a priority basis to couples with two children. The apartments are complete with basic furnishings. Heat, electricity (except for window fans and air conditioners), hot and cold water, garbage and trash collection, and maintenance of grounds are included in the rental charge. Rental charges per month are \$70.00 for the efficiency apartments, \$90.00 for the one-bedroom, and \$110.00 for the two-bedroom. For further information on the Duke University Apartments, write to the Housing Bureau, Duke Station, Durham, North Carolina.

Housing Deposit and Refund. A \$25.00 deposit is required of each applicant before a housing reservation is made. This initial deposit serves as a continuing deposit for successive terms.

*Wives of medical students desiring employment may secure information from the Duke Medical Center Personnel Office or the Duke University Personnel Office.

Refunds. The room deposit will be refunded under the following conditions:

1. Within thirty days after the student has been graduated.
2. Upon withdrawal from the University residence halls by students enrolled on the semester basis, provided written notice is received by the Director of Housing by August 1, for cancellation of a reservation for the fall semester, and not later than January 15, for cancellation of a reservation for the spring semester.
3. Upon withdrawal from the University residence halls by students enrolled on the basis of the medical term, provided written notice is received by the Director of Housing by August 1, for cancellation of a reservation for the term beginning in September, and not later than ten (10) days prior to the beginning of any subsequent medical term within the academic year.

The deposit required for apartments is refunded under similar circumstances; however, apartments are rented on a lease basis.

No refund will be made until the occupant has checked out of his room or apartment through the Director of Housing and has settled his account with the Bursar.

Dining Facilities

If a student dines on the Duke University campuses, the cost of food for the academic year ranges from \$450.00 upward, depending upon the individual.

The prices of food are the same in each of the University-operated dining facilities.

Motor Vehicle Registration

Each motor vehicle operated on the Duke University campuses by students enrolled in the School of Medicine must be registered at 08 Social Science Building within five calendar days after operation on the campuses begins, and thereafter must display the proper registration emblem.

Resident students are required to pay an annual parking fee of \$30.00 for each motor vehicle, excepting that a parking fee of \$10.00 is required for each motorcycle, motorbike, or motor scooter.

To register a vehicle, the student must present the following documents:

1. State vehicle registration certificate.
2. Valid driver's license.

3. Satisfactory evidence of automobile liability insurance as required by North Carolina law—\$5,000 per person, \$10,000 per accident for personal injuries, and \$5,000 property damage.

Parking, traffic, and safety regulations will be given each student who registers his vehicle. Students are expected to abide by these regulations.

Financial Aid

With the increasing cost of medical education, the need has also increased for financial assistance to deserving students. Three kinds of aid are currently available: scholarships or fellowships, loans, and cash awards. Where not stated, information concerning these may be secured from the Office of the Dean.

Scholarships—Fellowships

The Mary Duke Biddle Foundation Scholarships are awarded to academically distinguished medical students to assist them while they are in financial need. A scholarship may cover as much as the cost of tuition at Duke University School of Medicine during the period of an award.

The Charles Alva Strickland Memorial Fund Scholarships may cover up to full tuition costs. This scholarship may be renewed for each year after the first year. Merit and need are taken into consideration.

The Dr. Hillory M. Wilder Scholarship Fund covers full tuition for each of four years and is awarded on the basis of merit and need.

The Duke Medical School Alumni Scholarships are awarded to outstanding students, irrespective of financial need. These honorary scholarships carry an annual stipend of \$500.00 per year for each of four years.

The Pfizer Scholarship offered by Pfizer Laboratories, a division of Charles Pfizer & Co., Inc., is an award of \$1,000 granted to a student selected on the basis of merit and need.

The Manoocherian-Robbins Foundation Scholarship, a scholarship of \$500.00 for one year, is granted to one outstanding student each year. This award is made as a supplement to a student who has already been awarded some other scholarship aid.

The Wilburt C. Davison Scholarship was instituted to enable a medical student to widen his experience by clinical study outside of the United States. One award of \$500.00 is made each year. Information may be obtained from the Assistant Dean for Medical Student Affairs.

Student Research Fellowships are available as part of an extensive program designed to encourage the medical student to participate in research. Summer Fellowships carry a stipend of \$200.00 per month.

These Fellowships enable selected students, after completion of their first year, to participate in research during a summer vacation or other free time. Special Fellowships in Nutrition, Ophthalmology, Allergy, and other fields are also available. Opportunities also exist for a student to engage in research for an entire year during which time he temporarily discontinues his medical course. These Post-Sophomore Research Fellowships carry a stipend of \$3,200 per year plus an allowance for dependents and tuition expenses. In special circumstances these Fellowships are tenable at institutions other than Duke Medical Center and outside the United States. Information may be obtained from the Assistant Dean for Medical Student Affairs.

Awards

The Borden Undergraduate Research Award in Medicine. This is an award of \$500.00 to be given to the Duke senior who, on the recommendation of the Award Committee, has performed the best research work during his or her entire medical course, including that done during the preclinical years. Applicants should submit their papers, articles, or reprints to the Dean at least three months prior to expected date of graduation.

The Trent Prize in the History of Medicine. The Trent Prize was established by Mrs. Mary Trent Semans in memory of the late Dr. Josiah C. Trent to encourage students to undertake independent work in the history of medicine and to utilize the resources of the Trent Collection.

An annual award of \$100.00 is offered for the best essay by a Duke medical student on any topic in the history of medical and allied sciences. An additional book award will be made to each entry of merit. Students are invited to discuss possible topics with the Curators of the Trent Collection. Finished papers must be submitted to Mr. G. S. T. Cavanagh, Medical Center Library, by October 31 of each year.

Lange Medical Publications Awards. Textbooks and certificates are awarded to the Senior Class Valedictorian and the top ranking woman graduate. Textbooks are also awarded to the top two students in each of the upper three classes and to the president and representatives of the first year class.

C. V. Mosby Awards. Gift certificates for the purchase of books are awarded annually to five top students in the graduating class.

American Medical Women's Association Awards. An award of \$100.00 and a citation are presented to the woman medical student who graduates at the top of her class. An Honorable Mention citation is presented to all women students who graduate within the top ten per cent of their class.

Smith Kline & French Award for Medical Writing. An award of \$100.00 is made annually to the medical student who submits the most meritorious essay describing a piece of research. The paper must show

that particular attention has been given to clarity of writing, definition of objectives, presentation of results, and bibliography in correct form. Papers must be submitted to the Assistant Dean for Medical Student Affairs before November 30 of each year.

Merck Manual Awards. A copy of the *Merck Manual* is presented annually to past presidents of the Student Government Association and the Duke Chapter of the Student American Medical Association to recognize their contribution to the life of medical students at Duke University School of Medicine.

Roche Award. A gold engraved wrist watch and certificate is presented annually to the graduating senior who has achieved the highest academic performance throughout four years of medical school at Duke University School of Medicine.

Roche Medical Book Program. Each member of the senior class is sent a certificate that permits him to receive a medical textbook of his selection.

Duke University School of Medicine Awards. The past presidents of the Student Government Association and the Duke Chapter of the Student American Medical Association receive a book award in recognition of their contributions to student life.

The "Thomas Jefferson" Award. This award is made periodically to recognize outstanding achievement in fields outside those of medicine and science. The purpose is to identify individuals who have a broad range of talents and who have contributed materially to the life of the University as a whole.

The Frank L. Engel Scholarship in Endocrinology. A pecuniary award and a certificate is made annually to the student who has conducted the most meritorious research in the field of Endocrinology. The award commemorates the contribution of a former faculty member, Dr. Frank L. Engel, whose life was dedicated to research in endocrinology, teaching, and the care of patients.

The Upjohn Award in Community Medicine. This is an award of \$200.00 given to a Duke student for the best essay discussing some aspect of the social, cultural, economic, and other parameters of health. The paper should incorporate personal experiences. There is no limitation on length. Applicants should submit their papers by November 30 of each year to Dr. William DeMaria or Dr. E. Croft Long.

Loans

Loan funds are administered in accordance with the following regulations:

1. Loans will be made only to students who are taking full courses of study that lead to a degree. All loans except those from the Swett Funds must be arranged not later than July 1 of each year.

2. Every applicant for a loan must present with the application such security as the President of the University may approve, and no money will be advanced before a note with approved security is in the hands of the Treasurer of the University.

The Angier B. Duke Memorial Fund covers amounts up to full tuition for each of four years.

The W. K. Kellogg Foundation Funds are available for amounts up to full tuition for each of four years.

The Francis and Elizabeth Swett Funds are immediately available to students with emergency need. These loans are usually small and on a short-term basis.

The James L. Clark Memorial Fund provides financial aid to needy students who are outstanding in merit and dedication.

North Carolina State Loans are available to worthy students who agree to practice in a North Carolina rural area or small town of less than 2,500 population for at least four years after the completion of their professional training. To be eligible a student must have been a resident of North Carolina for the past eight years. The maximum loan to a medical student is \$1,400.00 per academic year (\$5,600.00 for a four year period). The student who receives a loan must, immediately following completion of the four year medical course, take a rotating internship of one year, and if approved by the Medical Care Commission, he will have the option of continuing the internship through a second year. Detailed information can be obtained from the North Carolina Medical Care Commission, Post Office Box 1880, Raleigh, North Carolina.

Health Professions Student Loan Fund was created by federal legislation and funds have been allotted to Duke University School of Medicine. Long term loans are made at favorable interest rates. Detailed information may be obtained from the Program Representative.*

*Dr. Joseph E. Markee through June 30, 1966, and Dr. Suydam Osterhout after July 1, 1966.



Admission

Intelligence, character, and integrity are the essential qualifications for admission.

A premedical student should be aware of the importance of a well-rounded general education as a preparation for the study of medicine and not limit himself to scientific courses. The Admissions Committee believes that the manner in which the college years are utilized is of greater importance than the specific subjects taken. The premedical student would be better advised to secure a knowledge of the principles and a thorough appreciation of the interrelations of the basic sciences than to accumulate credits in many courses. He should learn how to work independently, to observe critically, and to analyze rather than merely to store the information presented. Good study habits and use of time are perhaps the most important tools a student can bring to the study of medicine. His choice of studies beyond those required for admission should be governed by his own chief interests and by the intellectual stimulus to be derived from the work.

Application for Admission

Application forms may be obtained by writing to the Director of Admissions, Box 3710, Duke Hospital, Durham, N. C. Please do not send a request before August 1. Formal applications will be accepted by the Committee on Admissions only between August 1 and December 1.

Due to the large number of qualified applicants to all medical schools, each student is urged to apply to at least four schools.

Requirements for Admission

A minimum of ninety semester hours of approved college credit is necessary for admission to the School of Medicine. These must include:

One year of college English which must consist primarily of expository English composition.

Two years of chemistry. The first year should be inorganic and the second analytic and organic.

One year of physics.

One year of biology and/or zoology.

One year of mathematics which must include some calculus.

The following are strongly recommended courses but are not absolutely required:

Embryology

Calculus (one full year)

Genetics

All science requirements must be completed not more than seven years prior to entrance.

Medical College Admission Test is required of all applicants. It is administered by the Psychological Corporation, 304 E. 45th St., New York 17, New York. This test is given at many of the colleges throughout the country in May and October of each year. Arrangements for taking this test should be made by the student through his premedical advisor.

Selection

Selection is made between September 15 and February 15 for the student entering the following September. The data on each candidate are carefully screened by the Committee on Admissions. A personal interview will be arranged for those with satisfactory credentials. If the in their future practice of medicine are admitted. The candidate is notified as soon as possible whether or not he has been accepted. If he has distance from Durham is permissible, the interview is conducted here; otherwise, the candidates are referred to our regional representatives. Many factors are evaluated by the Committee in the selection process. Those students who show the most promise for exceptional performance

been accepted, it is necessary to send a deposit of \$50.00 by the succeeding January 15 in order to insure enrollment. This deposit is applied toward tuition and is refundable upon withdrawal prior to January 15. Inasmuch as admission must be offered a considerable period in advance of matriculation, the admission must be provisional upon the successful completion of the remaining college work. In addition, a physical examination is necessary prior to enrollment.

Advanced Standing

Applicants who have completed two years in most of the American schools will be considered for transfer only if space permits. Such transfer students would be required to complete the second and fourth years of our curriculum. For transfer, Part I of the National Board Examination is required as evidence of satisfactory accomplishment in the subjects taught in the first two years of most American schools.

A limited number of transfer students from foreign medical schools may be admitted each year. Such students should have completed their pre-clinical training and would be required to take Part I of the National Board Examination. If space permits these students would be admitted into the first year class in January only. By attending two summer sessions, a transfer from a foreign medical school can receive his M.D. degree from Duke University approximately two and one-half years after matriculation.

Transcripts

A student who wishes to transfer his credits to another institution should direct his request to the Recorder, Duke University School of Medicine. Transcripts are furnished without charge.

Summary for Applicants

Years of College work required	3
Tuition and fees for first year	\$1612.00
Estimated cost of equipment first year	265.00
Estimated room and board	920.00
Nonrefundable application fee	10.00
Deposit required on or before January 15, 1967, from accepted applicant	50.00
Medical College Admission Test required	Yes
Size of 1966-67 first year class	80

File application for admission between	August 1, 1966
Notification of action on application between	December 1, 1966
	October 1, 1966
	February 15, 1967
Date entering class starts school	September 4, 1967

Regional Representatives of the Committee on Admissions

- Alabama: *Birmingham*, Sam E. Upchurch
 Arizona: *Phoenix*, Stanley Karansky
 Arkansas: *Little Rock*, Rosalind Smith Abernathy
 California: *Berkeley*, H. I. Harvey; *Los Angeles*, Joseph A. Conroy, Jeremiah W. Kerner; *Menlo Park*, Gustave Freeman; *Palo Alto*, James B. Golden; *Pasadena*, Robert H. Pudenz; *San Francisco*, John E. Cann; *San Mateo*, Lester H. Margolis
 Canada: *Montreal*, J. E. Gibbons; *Toronto*, John B. Armstrong
 Colorado: *Denver*, F. Vernon Altvater
 Connecticut: *Hartford*, William H. Glass; *New Haven*, Clarence D. Davis, Saul A. Frankel, Joseph Mignone, Ned M. Shutkin; *Old Saybrook*, John R. Egan
 District of Columbia, Louis Spekter
 Florida: *Gainesville*, Lamar Roberts; *Lakeland*, Charles Larsen, Jr.; *Miami*, James J. Hutson; *St. Petersburg*, David S. Hubbell; *Tampa*, Richard G. Connor
 Georgia: *Atlanta*, E. B. Dunlap, Jr.
 Hawaii: *Honolulu*, James G. Harrison, Jr.
 Idaho: *Boise*, William L. Venning; *Idaho Falls*, Reid H. Anderson
 Illinois: *Chicago*, George H. Gardner, Daniel J. Pachman, E. Clinton Texter, Jr.; *Evanston*, Donald R. Mundie, Milton Weinberg, Jr.; *Monmouth*, Kenneth E. Ambrose
 Indiana: *Indianapolis*, Stuart O. Bondurant, John D. Graham
 Iowa: *Iowa City*, Arthur L. Benton
 Kansas: *Kansas City*, Ralph H. Major; *Wichita*, Thomas Jager
 Kentucky: *Lexington*, Kearns R. Thompson; *Louisville*, George Uhde
 Louisiana: *New Orleans*, Richard H. Corales, Jr., Harold M. Horack, Philip H. Jones, Richard M. Paddison
 Maine: *Portland*, E. Charles Kunkle
 Maryland: *Baltimore*, John T. King, C. Edward Leach
 Massachusetts: *Boston*, James H. Currens, Dorothy A. Elias, Ellison C. Pierce, Jr., James L. Tullis, R. Lewis Wright; *Milton*, Raymond D. Adams; *Springfield*, George A. Sotirion

Michigan: *Ann Arbor*, Muriel Meyers; *Detroit*, Robert F. Kandel; *Port Huron*, William T. Davison

Minnesota: *Rochester*, W. Henry Hollinshead

Missouri: *Kansas City*, Robert H. Barnes

New Hampshire: *Hanover*, George Margolis, Robert J. Vanderlinde

New Jersey: *Montclair*, Benjamin B. Burrill

New Mexico: *Albuquerque*, Robert Proper; *Artesia*, C. Pardue Bunch

New York: *Buffalo*, Olive J. Bateman; *Endicott*, James K. Tompkins; *Ithaca*, John G. Maines, Jr.; *Lockport*, Frank H. Crosby; *New York City*, Eugene L. Horger, Julia M. Jones, Michael J. Lepore, J. William Littler, Richard A. Ruskin, Robert A. Shimm; *Pittsford*, Rufus S. Bynum; *Syracuse*, James E. Sheehy

Ohio: *Cincinnati*, Murray B. Sheldon, Jr.; *Cleveland*, C. Norman Shealy, *Columbus*, Robert J. Atwell, Charles A. Doan, James V. Warren; *Dayton*, Stuart R. Ducker; *Toledo*, William A. Phillips; *Elyria*, William L. Hassler

Oklahoma: *Tulsa*, Gerald E. Cronk

Oregon: *Portland*, Richard R. Carter

Pennsylvania: *Bethlehem*, Ralph K. Shields, James G. Whildin; *Bryn Mawr*, John V. Blady; *Johnstown*, W. Frederick Mayer; *Philadelphia*, Max W. Fischbach, Karl C. Jonas, Alfred M. Sellers; *Pittsburgh*, Jack D. Myers

Puerto Rico: *Santurce*, Kenneth B. Brown

Rhode Island: *Providence*, Marshall N. Fulton

South Carolina: *Charleston*, Edward F. Parker, J. I. Waring; *Columbia*, Ben N. Miller; *Greenville*, Raymond C. Ramage

Tennessee: *Chattanooga*, Richard Van Fletcher; *Memphis*, Raphael E. Semmes; *Nashville*, A. Greer Ricketson; *Sewanee*, Henry T. Kirby-Smith

Texas: *Dallas*, A. James Gill; *Galveston*, Henry L. Burks, R. H. Rigdon; *Houston*, H. Grant Taylor; *Midland*, Dorothy B. Wyvell; *San Antonio*, Royall M. Calder

Utah: *Salt Lake City*, Thomas Ray Broadbent

Vermont: *Burlington*, Rufus C. Morrow

Virginia: *Charlottesville*, Henry B. Mulholland

Washington: *Seattle*, W. A. MacColl

West Virginia: *Charleston*, Harold H. Kuhn

Wisconsin: *Madison*, O. A. Mortensen

Courses of Instruction

(See listing of Faculty, Staff, and House Staff beginning on page xvii.)

Anatomy

Professor J. Markee, *Chairman* (Through June 30, 1966); Professor J. Robertson, *Chairman* (Effective July 1, 1966); Professors J. Everett, T. Peele; Associate Professors R. Becker, J. Buettner-Janusch, W. Cuyler, K. Duke, M. Moses; Assistant Professors F. McFalls, C. Christian; Associates J. Goree, F. Bassett

Instructors J. Wilson, M. Rundles, W. Redmond

Required Course

The core course of instruction in Human Anatomy will constitute about 253 hours during the first 18 weeks of the first year. The gross anatomy of the head, neck, and trunk will be studied during the first 11 weeks, histology during the first 13 weeks, and neuroanatomy during the 15th through 18th week. The gross anatomy of the back, pectoral and pelvic girdles, and the limbs will be studied during the 12th through 14th week. All of the above will be integrated with the other material studied during the first year. Emphasis will be placed upon the study of the material in the laboratory. In an attempt to utilize more fully the laboratory time, audio-

visual education methods will be employed as fully as possible. These techniques will consist of color motion pictures of demonstration dissections, closed-circuit television, color lantern slides, and motion pictures. All of the instruction is designed to be as informal and as nearly individual as possible. General principles and the functional viewpoint of living anatomy will be stressed in the hope that the student may be stimulated to secure a working knowledge of anatomy in the broadest sense. Whenever possible, fresh tissues and living cells will be made available for examination. Patients exemplifying anatomical principles will be presented, some within the classroom, others over live television, and others prerecorded on videotape for later presentation at the appropriate time in the students' learning experience.

In gross anatomy all of the students will dissect the important structures in certain areas of the body; namely, within the neck, thorax, abdomen, and pelvis. In other regions the students will do little or no dissection but will instead view prosections as well as prerecorded TV programs and motion pictures. The regions that will be presented in this manner include the back, the pectoral and pelvic girdles, the limbs, and the interior of the cranium, including the gross anatomy of the ear, orbit, oral and nasal passages, and paranasal sinuses. The general principles of programmed learning will be utilized even more extensively than in the past few years.

In microscopic anatomy the students will be introduced to electron-microscopy, and the teaching will be focused on the cell, its generalized structural and functional organization, and its differentiation in various organs and tissues. The students will be introduced to biochemical cytology and to biophysical cytology and cytological genetics.

In neuroanatomy the students will be introduced to neurocytology, nerve cells, and glia. The major part of the course will deal with: (a) the spinal cord, including the ascending, descending, and associative tracts; (b) the brain, brain stem, and cranial nerves 3 through 12; (c) the autonomic nervous system; (d) the cerebellum, brain stem, and reticular formation; (e) the thalamus and hypothalamus; (f) the cerebral cortex, including its structure and blood supply and primary pathways; and (g) the somatic sensory and the motor systems, as well as the visual, auditory, olfactory, and limbic systems. There will also be clinical neurology presentations of suitable patients.

The students will spend about 111 hours in gross anatomy, about 78 hours in microscopic anatomy, and about 64 hours in neuroanatomy.

Elective Courses

Gross Anatomy

Anatomy as Related to Locomotion. Complete dissection will be

performed of that part of the body concerned with locomotion and posture; namely, the back, the pectoral and pelvic girdles, and the superior and inferior extremities. Visual aids of all kinds will be used extensively. This course will be designed to meet some of the needs of Ph.D. candidates in Anatomy, as well as students interested in general practice, orthopaedics, or neurosurgery. Prerequisites: either the core course in Anatomy or Anatomy 205 which may be taken concurrently. Four units of graduate credit (18 lecture hours and 171 hours of laboratory work, from February to June). (This course, listed in the *Bulletin of the Graduate School* as M201, will not be given in 1966-1967.) Drs. Markee, Everett, Becker, Duke, and Bassett

Anatomy of the Viscera. This is a study of the anatomy of the thoracic, abdominal, and pelvic organs. Emphasis will be primarily upon the anatomy of these viscera and their blood supply, innervations, and relationships. While primarily a laboratory course, the dissections will be augmented by extensive use of prosections, motion pictures, and pre-recorded TV presentations. This course is designed for Ph.D. candidates in Anatomy as well as for future general practitioners and specialists in Internal Medicine. Prerequisite: core course in Anatomy. Two units of graduate credit (18 lecture hours and 72 hours of dissection, from February to June). (This course, listed in the *Bulletin of the Graduate School* as M205, will not be given in 1966-1967.) Drs. Markee, Everett, Becker, and Duke

Anatomy of the Interior of the Cranium and Deep Face. This course will deal with: (a) the interior of the cranium and the ear, eye, and orbital contents; (b) deeper structures of the head, including the brain and its blood supply and venous drainage; (c) the nasal and oral cavities as they are related to the pharynx; and (d) paranasal sinuses. This course is designed to meet the needs of the Ph.D. candidates in Anatomy as well as the needs of general practitioners and the specialists including neurosurgeons, clinical neurologists, ophthalmologists, and otolaryngologists. The major emphasis will be on gross dissections. Visual aids of all types will be utilized extensively. Prerequisites: core course in Anatomy or the equivalent. Two units of credit (18 hours of lectures and 72 hours of dissection, from February to June). Drs. Markee, Everett, Duke, and McFalls

Special Dissection of a Restricted Region. This course is designed for any group of students with a special interest. For example, the heart and its anatomical characteristics and relationships or in some other region. This course will be planned for the individual needs of the group of students requesting the course. Prerequisite: core course in Anatomy. Units of credit may vary from one to three. Conference hours should total about 18 and laboratory hours totaling 36 to 72. (This course is currently listed in the *Bulletin of the Graduate School* as M312.) Drs. Markee, Everett, Duke, and Bassett

Neuroanatomy

Laboratory Work and Special Neuroanatomy. This course will involve laboratory work and conferences on special areas of the human central nervous system. One course will be available per year and will be made available to the five to ten students who can agree upon a single discrete area of this advanced instruction in neuroanatomy. The areas of choice will be the following: (a) the brain and brain stem and cranial nerves 3 through 12, (b) the autonomic nervous system, (c) the cerebellum and brain stem and reticular formation, (d) the thalamus and hypothalamus, (e) the cerebral cortex, including its structure and blood supply and primary pathways, and (f) the somatic sensory and the motor systems, as well as the visual, auditory, olfactory, and limbic systems. This course will be designed for graduate students and for medical students who intend to specialize in neurosurgery or clinical neurology or in ear, eye, and throat with a special concern in the nervous system. This course would also be suitable for those few psychiatrists who have a real interest in certain parts of the central nervous system. Two units of credit (18 conference hours and 144 laboratory hours, from February to June).
Dr. Peele

Reproduction and Development

Reproduction. A lecture and laboratory course dealing with mammalian reproduction. The rat and rabbit will serve as the principal laboratory subjects. The following areas will be covered: embryology of the reproductive system; gonadal structure, gametogenesis, and hormone production; structure and function of the diencephalic-pituitary system; structural, chemical, and behavioral actions of sex hormones; mechanisms of fertilization and implantation; placental structure and function; and lactation. February to June (1966 and alternate years). Four units of graduate credit. Admission with approval of instructors. This course is listed in the *Bulletin of the Graduate School* as Anatomy M378 and Physiology 378.) *Drs. Everett, (Anatomy) and Kostyo (Physiology)*

Human Developmental Anatomy and Fetal Physiology. A survey of principles of human morphological development from conception to birth with emphasis on selected aspects of physiological and behavioral development *in utero*. Prerequisite: core course in Anatomy. Two units of credit (36 hours of lectures and conferences, from February to June).
Dr. Becker

Physical Anthoropology

Physical Anthropology. A survey of the major developments of physical anthropology. Human evolution, primate phylogeny, paleontology of man and other primates, primate biochemical genetics, primate behavior, and

human variation (genetics and somatic) are the principal topics of the course. Prerequisite: core course in Anatomy. Three units of graduate credit (18 lecture hours and 72 hours of laboratory work, from February to June). (This course is currently listed in the *Bulletin of the Graduate School* as Anat. M231 and also as Soc. 231.) *Dr. Buettner-Janusch*

Microscopic Anatomy

Advanced Microscopic Anatomy. This course will deal in depth with selected topics of current significance that concern the relation of structure to function in cells and tissues. Recent contributions to basic problems of ultrastructure, growth and development, endocrinological control, physiological differentiation, and evolutionary origins of functional systems (of cells, tissues, and organs) will be emphasized. Prerequisite: core course in Anatomy. Two units of credit (36 hours of lecture and conference). February to June. *Drs. Robertson, Becker, Buettner-Janusch, Duke, Everett, and Moses*

Biophysical Cytology. The emphasis will be placed on the relation of large molecules to the structural and functional organization of cells, e.g. mitoses, patterns of DNA organization in cells, contractile protein membranes, and others. Prerequisite: core course in Anatomy. Three units of credit. February to June. *Drs. Robertson and Moses*

Neurocytology. This course will deal primarily with the neurosecretory process, impulse transmission, and with memory. Prerequisite: core course in Anatomy. Four units of credit (36 hours of conference and 72 hours of laboratory work). February to June. *Drs. Peele and Duke*

Tissue Culture. This course will deal with biology of cells in tissue culture. It will consider those areas in cytology that can best be approached by means of tissue culture combined with time-lapse motion picture photography. Examples are: (a) the study of cilia and photographic recording of changes in their movement after alteration in the media and (b) changes in the cell membrane including the motion picture recording of the passage of substances through the membrane. Prerequisite: core course in Anatomy or its equivalent. Three units of credit (18 hours of conferences and 72 hours of laboratory work). February to June. *Drs. Markee and McFalls*

Topics in Cell Structure and Function. Advanced discussions of selected problems such as chromosome structure, mitosis, and cytological aspects of inheritance and development. Prerequisite: core course in Anatomy. Two units of graduate credit (27 hours of lecture, conference and demonstrations, plus library research papers). February to June, 1966 and alternate years. (This course is listed in the *Bulletin of the Graduate School* as Anatomy M244 and also as Zoology 244.) *Drs. Moses (Anatomy) and Nicklas (Zoology)*

Analytical Cytology. This course will stress the application of modern

microscopic methods to the analysis of problems of cell biology, and will provide experience in techniques such as light and electron microscopy, cytochemistry, cytophotometry, polarization microscopy, interference microscopy, and autoradiography. Prerequisite: core course in Anatomy. Three units of credit (18 hours of conference and 72 hours of laboratory). *Drs. Moses and Robertson*

Electron Microscopy. The emphasis will be on the theory, operation and use of the electron microscope and on the procedures for preparing biological materials for morphological examination and for cytochemical and autoradiographic analysis. Prerequisite: core course in Anatomy. Two units of credit (18 hours of conference and 36 hours of laboratory). February to June. *Drs. Moses and Robertson*

Biochemistry

Professor P. Handler, *Chairman*; Professors M. Bernheim, E. Davidson, S. Gross, W. Guild, R. Hill, C. Tanford, H. Kamin, R. Thiers, S. Wakil; Associate Professors W. Byrne, J. Harris, W. Lynn, K. McCarty; Assistant Professors I. Fridovich, R. Greene, N. Kirshner, H. Sage, R. Wheat; Associates E. Marler, T. Rosett

Research Associates Y. Nozaki, K. Rajagopalan; *Technical Associate* L. Daniels; *Fellows* M. Bilimoria, K. Brendel, K. Brew, R. Delaney, E. Ellis, R. Fellows, K. Hade, R. Hartenstein, J. Hijmans, P. Hochachka, K. Kawahara, T. Kuwaki, S. Lapanje, M. Mizugaki, M. Ohkido, H. Pape, H. Schults-Holthausen, L. Siegel, J. Sullivan, J. Swanson, H. Tritschler, J. Vorhaben, G. Weeks, H. Yardley, M. Zarlengo

Required Course

The required course in Biochemistry for first year students is given over a period of eighteen weeks in the first term. The first phase is devoted to a survey of the chemistry of the materials fundamental to all life proteins, fats and carbohydrates, and the nature of enzymatic action. This is followed by consideration of those events in intermediary metabolism common to the life of all mammalian cells. The special metabolism of muscle, kidney, bone, erythrocytes, liver, and connective tissue and the chemical aspects of digestion, respiration, electrolyte, acid-base, and fluid balance are presented with relation to the study of the physiology of the organs so as to facilitate integration and correlation of the two disciplines.

Elective Courses

Advanced Biochemical Laboratory. This course is specifically designed for third year medical students who select Biochemistry or a closely

related area for specialization for the Fall quarter. The laboratory experience will emphasize modern laboratory techniques, such as radioisotope detection, chromatography, and spectrophotometry. These techniques will be illustrated by experiments from diverse areas of biochemistry such as lipid metabolism, protein biosynthesis and enzyme kinetics. Students will have the time and opportunity to modify and extend the basic formal experiments. Simultaneous registration in Biochemistry of Disease, Energy Metabolism and Seminar is highly recommended. Sixteen hours per week for 18 weeks. First and second quarters. Limited to 20 students.

Drs. Lynn, Rosett, and Staff

Biochemistry of Disease. This course is designed for the third or fourth year medical student who is interested in the primary defect, manifestations, and diagnostic aspects of diseases of metabolic or genetic origin. Examples of emphasis would include a study of the primary defects in diabetes mellitus and other endocrine disorders, disturbances of electrolyte metabolism, genetic lipidoses, etc. Two hours per week for 18 weeks. First and second quarters. Limited to 40 students. *Dr. Thiers and Staff*

Biochemistry-Medical Scientists Seminar. This seminar is designed for the third year medical student who selects Biochemistry for his area of specialization. It will be a cohesive force which will strive to give perspective to the overall third year biochemistry program through student participation and guest speakers. One hour per week for 36 weeks. Limited to 20 students. *Dr. Byrne and Staff*

Chemistry of Natural Products. This is a required course in the Ph.D. program in Biochemistry and is available to all who wish a more sophisticated understanding of the molecular structure, physical and chemical properties of sugars, polysaccharides, fatty acids, simple and complex lipids, steroids, etc. Two hours per week for 18 weeks. First and second quarters. Limited to 40 students. *Dr. Davidson*

Energy Metabolism. This required course in the Ph.D. program is often selected as part of a minor in Biochemistry. It is a lecture course on the intermediary metabolism of carbohydrates and lipids. Included are detailed consideration of biological oxidations, oxidative phosphorylation, and the control of energy-yielding pathways. Three hours per week for 18 weeks. First and second quarters. Limited to 40 students. *Drs. Wakil, Wheat, Fridovich, and Lynn*

Nitrogen Metabolism. A required lecture course in the Ph.D. program, this course is often selected as part of a minor in Biochemistry. It is devoted to consideration of the biosynthesis of nitrogen-containing compounds, including amino acids, purines, pyrimidines, and proteins. The fate of preformed or synthesized nitrogen-containing compounds is also discussed. Amino acid biosynthesis is used as an opportunity to discuss the control of biosynthetic pathways through enzyme inhibition and regulation of protein biosynthesis. Two hours per week for 18 weeks.

Third and fourth quarters. Limited to 40 students. *Drs. Kamin, Greene, and Kirshner*

Proteins and Enzymes. This is a required lecture course in the Ph.D. program. After consideration of the chemical characterization and synthesis of amino acids, peptides, and proteins, the theoretical basis and interpretation of physical techniques such as ultracentrifugation, spectrophotometry, titration, viscometry, light scattering, x-ray diffraction, and optical rotatory dispersion as applied to proteins are discussed in detail. After a treatment of enzyme kinetics, enzymes are considered in terms of the mechanism of their action and useful chemical models of enzyme activity. The terminal series of lectures is used to illustrate current research efforts which are aimed at a molecular understanding of the known physiological properties of selected enzymes and structural proteins. Four hours per week for 18 weeks. Third and fourth quarters. Limited to 40 students. *Drs. Tanford, Hill, and Byrne*

Genetics. This is a required course in the genetics Ph.D. program but will also be available to other students. It will be taught by faculty from the genetics division of the Biochemistry Department and will include a comprehensive survey of classical genetics, mammalian genetics, microbial and virus genetics, cytogenetics, population genetics, functions of DNA, functions of RNA, and genetic mechanisms. Three hours per week for thirty-six weeks. Limited to forty students. *Drs. Guild and Gross*

Clinical Chemistry Laboratory. Individual students may participate in the program of the Clinical Chemistry Laboratory. Students must receive the permission of the instructor. Minimum of twenty clock hours per week for three to nine weeks. Limited to eight students. *Dr. Thiers*

Graduate Student Seminar. This is a required part of the Ph.D. program. Each Ph.D. candidate must register for two semesters, and he is expected to attend regularly during his entire time in the Ph.D. program. During the first semester students give a seminar on one of a series of related topics under the direction of one faculty member. During the second semester students select their own topics and an appropriate faculty adviser. One hour per week for 36 weeks. Limited to 25 students. *Staff*

Faculty and Guest Speaker Seminar. During the school year there is at least one seminar per week based on original research by the faculty or invited guests. This is not a formal course, but students are expected to attend.

Research. Students may register for research under the direction of an individual member of the faculty. Permission to register must be sought from the faculty member concerned. The total amount of time, days, and hours are to be determined by arrangement with the selected research director.

Community Health Sciences

Professor D. T. Smith, *Chairman*; Professors W. DeMaria, E. C. Long; Associate Professors S. Heyden, E. Persons, T. Williams; Assistant Professors R. Portwood, M. Bryson, W. O'Fallon; Associates D. Naumann, C. Knight

Required Course

The required course in Community Health Sciences will be given during the second year. Two hour lectures are given by faculty and guests each week. This series serves as an introduction to biostatistics, epidemiology, industrial medicine, community health and family physician, and transmission and natural history of some diseases.

Elective Courses

Prospective Medicine—The Human Response to Environmental Agents. The range and variation of human response to overt and subtle environmental agents will be studied prospectively. The normal adaptative and immunologic mechanisms through which the human acts and reacts to maintain health will be discussed in chronological sequence from conception through senility. Fundamental and applied information from medical, clinical, and social sciences will be included. Conditions or diseases with (1) known etiologic agents, such as viral, bacterial, fungal, or parasitic, and (2) unknown etiology, such as hypertension and peptic ulcer, will be discussed. No limit to number of students. Three consecutive hours, once each week. Second quarter. *Dr. DeMaria and Staff*

International Health Organizations. A seminar surveying the history, organization, and accomplishments of the World Health Organization and its regional offices, health programs of the U. S. Agency for International Development, the Alliance for Progress, the Rockefeller, Kellogg, and other private foundations. Smaller private organizations (HOPE, MEDICO) and their contributions will be considered. Prerequisite for International Medicine. Three lectures a week for one quarter to be given once per year. Five to ten students. Second quarter. *Dr. Long and Staff*

International Medicine. This course will include a survey of the interrelationship of health with political, economic, and educational programs, with emphasis on the problems of developing countries. Health problems of Latin America and Middle Africa will be given detailed consideration. The course will include a written paper by each participating student. Course on International Health Organizations is a prerequisite. Three lectures a week for one quarter. Quarter to be determined. *Dr. Long and Staff*

Research Preceptorship in International Health. The student will make a detailed study of a major health problem in the Western Hemisphere, using library and other resources. Spanish language instruction will be included through the Summer School program. The preceptorship will include a visit to a Latin American country for which financial assistance will be available. Courses on International Medicine are prerequisites. Four days a week. Summer quarter. *Dr. Long*

Research Preceptorship in Studies of Renal Function and the Vasculature. The student can enter into current projects or conduct independent study under senior staff guidance. The studies range from enzyme analysis of specific tissues under autonomic and pharmacologic influence to human conditioning experiments involving the cardio-renal systems. Full time for at least three consecutive quarters. One or two students by special arrangement. *Dr. DeMaria*

Adolescent Medicine. These series will review primarily the sequence of biological events occurring during this transitional phase of human development. Relationship of these factors to the diseases and psychosocial problems encountered will also be discussed. One hour per week. Third and fourth quarters. No limit on number of students. *Drs. DeMaria, Persons, Portwood, Naumann, and Guests*

Student Health. One half time (afternoon) for one or two quarters by special arrangement. *Dr. Persons and Staff*

Note: The Department will offer an elective three-phase program utilizing summer and/or elective periods. This is a formal and applied program in community health at a national and international level and is under the combined direction of the University of North Carolina School of Public Health, University of North Carolina Department of Preventive Medicine, and the Duke Department of Community Health Sciences. *Drs. DeMaria and Long by special arrangement.*

Endocrinology

Associate Professor H. Lebovitz, *Director*; Associate Professor H. McPherson, *Director, Endocrine Clinic*; Professors W. Lynn, W. Nicholson, R. Parker, J. Sidbury; Associate Professors R. Bressler, C. Christian, J. Kostyo, C. Peete, R. Stempf, J. Wynn; Associates R. Gibbs, E. Lamb

Fellows A. Al-Asadi, R. Fellows, J. Goldman, H. Harrison, E. Horton, E. Long, C. Phipps, T. Huff, B. Sheikholislam, J. Younger

The Division of Endocrinology was organized by Dr. E. C. Hamblen in 1936 as a division of the Department of Obstetrics and Gynecology. In 1955 it was reorganized as an integrated service with a staff drawn from several clinical and preclinical departments. Its objective is to give com-

prehensive training in basic and clinical Endocrinology and metabolism, particularly at the postgraduate level. Although individual senior staff members have their own special clinical and research programs, the division is organized so that clinics, conferences, ward rounds, and seminars are participated in as joint ventures by the entire staff. The endocrine laboratory and its services are available to all members of the staff equally. Resident physicians from Medicine, Obstetrics and Gynecology, and Pediatrics rotate through the endocrine division. At any one time there are usually four residents assigned to the division. Clinical and research fellows and trainees are assigned to individual senior staff members, depending on their major interest, but all participate essentially equally in the clinics, teaching rounds, and conferences.

The general Endocrine Clinic meets two mornings and the Metabolism-Diabetes Clinic one morning each week. The Pediatric Endocrine Clinic meets one afternoon a week. All fellows have the opportunity to attend these clinics and in addition the clinical fellows assist in the care of the private patients with endocrine and metabolic disturbances including diabetes. Twice a month the endocrine clinic meets jointly with the neurosurgical tumor follow-up clinic to review patients with pituitary tumors and related brain lesions. Ward rounds on inpatients are held from 4-5 p.m. Monday and Friday and at 9 a.m. on Wednesday each week. An endocrine conference is conducted weekly. In addition, each of the supporting services (Medicine, Obstetrics and Gynecology, and Pediatrics) has special conferences, lectures, and seminars of endocrine interest which are available to the staff.

Medical Research Training Program

Associate Professor M. Moses, *Director*; Professors W. Guild, S. Gross; Associate Professor K. McCarty; Assistant Professors O. Jones, T. McManus

The Medical Research Training Program is an elective program available to qualified students after completion of the first two years of the curriculum, and to members of the Duke Hospital resident staff, post-doctoral fellows in the clinical and preclinical departments, and qualified graduate students.

The objective of the program is to provide a more sound basis for the future work of those hoping to devote their lives to a career in investigative medicine and biology. Approximately eight medical students and eight postdoctoral fellows are accepted annually. Applicants are admitted upon recommendation by a faculty committee on the basis of past academic performance, evidence of research bent and curiosity, and motivation toward an academic research career.

The program offers an academic year (September to June) of full-time research training in medical sciences basic to clinical investigation, and emphasizes primarily cell and molecular biology. It includes three types of activities. (1) Three months are devoted to an extensive series of laboratory experiences in cytology and fine structure, cell and tissue culture, biochemical studies of cell growth, microbial and biophysical genetics, protein synthesis and its genetic determination, physical biochemistry of nucleic acids and of proteins including antibodies and enzymes, membrane functions, and organized cellular controls. These three introductory months are designed to familiarize the student with concepts and experimental approaches in these fields, and with the use of important and complex tools and techniques not ordinarily taught in undergraduate courses. (2) Six months are devoted to a research problem conducted either in the general laboratory set apart for this program or in the laboratory of one of the faculty with whom the participant chooses to work. (3) Seven hours per week, throughout the year, are devoted to class work in mathematics, biostatistics, and physics in courses expressly designed for students of this program. During the research period, one evening each week is devoted to seminar work. Special lectures are given by guests from the University faculty or from other institutions. The entire program is housed in a special wing of the W. B. Bell Medical Research Building, and is under the direction of members of the faculty who devote themselves largely to this training program.

The qualified medical student can participate in this program without delaying his graduation and without increasing the cost of his education. By using two summers of clinical studies, and by receiving elective credit for two of the four quarters in the training program, he enters his senior year abreast of his class. After the new curriculum begins, this course will fulfil requirements for the third or fourth basic science year. He receives a training stipend of \$300.00 per month during those quarters of the program for which he does not receive curriculum credits toward graduation. He ultimately pays the same tuition as any other medical student.

The Graduate School of Duke University will also accept the total of the first two years of medical school plus participation in this program as residence time toward the degree of Doctor of Philosophy. In addition, the individual student must satisfy the language and dissertation requirements of the Graduate School and any special requirements stipulated by the department in which he elects to obtain this degree. The combined degree program is arranged individually and requires a minimum of five and a half to six years.

It is suggested that medical students undertake this program at the completion of the first two years of the curriculum and then return to the normal clinical medical curriculum. Such students should also expect

to undertake two or more years of a postdoctoral research fellowship in the course of their residency training in order to prepare themselves fully for research oriented careers in academic medicine.

Medicine

Professor E. Stead, *Chairman*; Professors M. Bogdonoff, J. Callaway, E. Estes, O. Hansen-Pruss, J. Hendrix, A. Heyman, W. Kempner, G. Kerby, W. Lynn, H. McIntosh, E. Menefee, W. Nicholson, E. Orgain, E. Persons, J. Ruffin, R. Rundles, H. Sieker, J. G. Smith, M. Tyor; Associate Professors R. Bressler, S. Friedberg, J. Greenfield, K. Kilburn, J. Laszlo, H. Lebovitz, H. McPherson, T. Peele, E. Peschel, J. Pfeiffer, R. Robinson, H. Saltzman, D. T. Smith, R. Whalen, J. Wynn; Assistant Professors I. Brody, C. Buckley, J. Clapp, W. Dobbins, J. Flanagan, W. Floyd, R. Gorten, O. W. Jones, R. Klein, J. Kylstra, S. Osterhout, R. Portwood, H. Silberman, H. Thompson, A. Wallace; Assistant Clinical Professors A. Cooper, G. Paulson, C. Styron; Associates T. Andreoli, J. Boineau, M. Dick, C. Gerber, R. Gibbs, J. Gunnells, C. Hayes, J. Hijmans, E. Marler, R. McCloskey, J. Morris, B. Newborg, F. Schoonmaker, J. Stiefel, W. Troyer, R. Wilson; Clinical Associates S. Barefoot, W. Batten, J. Bumgarner, G. Crane, W. Fitzgerald, T. Jones, G. Koury, T. Long, E. Lupton, J. Lusk, J. A. Moore, H. Perkins, W. Singletary, A. D. Smith, D. Welton, C. Curry, C. Johnson

Instructors W. Austad, B. Bain, V. Behar, W. Bell, E. Belton, B. Bernstein, C. Church, F. Cobb, R. Craig, A. Dowell, M. Entman, P. Gebel, J. Goldman, H. Grode, A. Harley, H. Harrison, R. Hornsby, E. Horton, T. Huff, V. Hurst, G. Irons, Y. Kong, W. Kremer, C. Krock, M. McLeod, H. Nagaya, J. Nowlin, M. Ohkido, P. Phillippi, C. Phipps, W. Raphael, J. Roberts, R. Rosen, C. Rubenstein, H. Ruskin, J. Ruskin, R. Schneider, M. Siegelman, R. Stone, C. Thomas, A. Voytovich, P. Webster, W. Weglicki; *Chief Residents* M. Hatcher, B. Herrero, W. McAfee, E. Metz; *Assistant Residents* M. Basson, J. Blount, J. Broughton, N. Brown, R. Brown, J. Bush, H. Carpenter, C. Cox, F. Dalton, J. Douglas, M. Dunaway, R. Durrett, G. Ellis, A. Gabor, J. Goldman, C. Grim, J. Gutterman, J. Hall, L. Harris, P. Hathaway, D. Holloway, P. Imperato, C. Johnson, E. Lewis, C. Mansbach, G. Massing, D. Martin, H. McDaniel, G. Miller, G. Molinari, R. Noble, T. Pozefsky, V. Rhoades, B. Ruffner, S. Schaal, H. Schiff, P. Shiner, D. Taylor, J. Temple, B. Tharp, J. Thompson, R. Wilkins, D. Zipes; *Interns* M. Andriola, T. Asmundsson, G. Basson, W. Bland, G. Butcher, T. Clancy, H. Cohen, B. Dixon, F. Ginn, R. Gilgor, R. Harner, R. Karpick, R. Katz, S. Kohler, K. Krauss, S. Kulvin, J. Nordlund, A. Pribble, C. Riley, S. Rostand, E. Rutsky, R. Schwartzman, K. Shultz, R.

Required Courses

The Department of Medicine traditionally has the responsibility of preparing the student for a lifetime of learning as he gives care to patients who ask him for help. The first step is to begin to think and act like a doctor. Two courses in the first year—Introduction to Clinical Medicine and Clinical Microscopy—prepare the student to take an active role in patient care.

The student assigned to Medicine, or electing Medicine, in the second and fourth years acts in the role of a physician. His desire to give good care is the motive which drives him to excellence. He learns to identify properly the problems of the patient. Having identified the problems, he marshalls the information which he can bring to bear on them by his past training; he recognizes the gaps in his knowledge as he attempts to focus the information learned from the basic sciences onto the specific clinical problem. Using the patient as his means of integration, he continues his reading in anatomy, physiology, microbiology, pharmacology, and biochemistry. In this clinical setting, he has the opportunity to speak many words which he has previously only read; he discusses the problem with his fellow students, interns, residents, and senior staff; he gains familiarity with ideas and concepts by actively manipulating them.

The student crystallizes his idea of the best diagnostic and therapeutic approach to this particular patient. He identifies the reasons for each of these decisions. He has real curiosity to see if his evaluation of the situation is correct or in error. He learns that the course of biology is uninfluenced by strong statements, by the rank of the faculty member, or by the number of supporting references not quite applicable to the points in question.

Under guidance from his fellow students and from faculty of all ranks, he slowly appreciates the difficulties of learning in this system of multiple variables operating on only partially defined substrates. Part of a doctor's learning is only experimental. He knows from living with his patients that certain things are possible, but he does not know the underlying sequence of events. In other instances, his learning is more precise because he understands and can control some of the important variables. He must learn both the liabilities and virtues of attempting to use logic in clinical practice.

The goal of the Department of Medicine is for the student to have as many learning experiences as possible in which he plays an active role. We hope that he will enjoy these learning experiences so much that he will continue them as long as he sees patients. We are not interested in covering the entire field of medicine. If one of our graduates meets a new

problem, correctly identifies it, and has pleasure in solving it, we are satisfied. We are not concerned that a new area of knowledge is being explored without our guidance.

In caring for our patients with ill-defined genetic and acquired differences and with many variables of unknown strength at play, many erroneous conclusions are drawn. The student has to learn to examine statements, both oral and written, with care, and to ask of all authorities the source of data which underlie their conclusions. One way for the student to learn the difficulties in drawing accurate conclusions about biological systems is to give him the opportunity to establish some fact on the basis of his own work. We call this research, and find it a very effective method of teaching. The intellectual discipline involved better prepares him for the role of a lifetime learner.

The health field is a broad one. Anyone with intelligence enough to gain entrance to the Medical School can find an area where he can be happy and productive. We are interested in producing manpower for the entire field. We are not interested in molding our students into any single career in the health field. The faculty accepts the fact that our intake is heterogeneous and that our output will be heterogeneous. Our role is to identify the area where the individual will be most productive and happy, and to help him reach this goal. We will continue to produce general practitioners, specialists, administrators, research workers, biologists, government workers, and various combinations. There is no special honor attached to any of these roles. Our primary interest is that our graduates are productive and receive emotional and intellectual satisfaction from their work.

Introduction to Clinical Medicine. This course is initiated in the first year by introductory lectures, case discussions, and instruction in methods by physical examination and history taking. Early in the course, students begin work at the bedside in the examination of selected patients. The emphasis throughout is placed on instruction individually and in small groups. The interpretation and pathologic physiology of abnormal findings are stressed. Instruction in the more specialized methods of examination is provided by coordinating the lectures, case discussions, and individual student instruction from the departments of Medicine, Neurology, Obstetrics and Gynecology, Pediatrics, Psychiatry, Radiology, and Surgery. In addition, the lectures and laboratory sessions in Clinical Microscopy are coordinated with the overall program. In the latter part of the year, special emphasis is placed on student correlation of the history, physical finding, and pathologic physiology in the individual patient problem.

Clinical Microscopy. This course is given in the first year and, along with lectures and assignments providing practice in history taking and physical diagnosis, comprises an introduction to medicine designed to equip the student to participate in patient care on the wards and in the

clinics. The essentials of hematology are reviewed. Laboratory work includes blood cell counts, the preparation and interpretation of blood films, and the examination of fresh material, such as urine, stools, spinal fluids, sputum, transudates, and exudates. This course is supplemented in the clinical years by hematology conferences and by daily ward and laboratory rounds.

Second Year Medicine. The student spends one term of his second year in Medicine where he is assigned to one of the medical wards or to the medical clinic. He forms part of a medical team composed of interns, first year residents, and senior staff and takes an active part in the care of patients. The number of patients assigned to him does not vary with the load. He is given this protection to allow him time for synthesis of his basic science experiences with the problems of his patients. When indicated, the undergraduate experiences are integrated with the graduate program. In such an instance, the program of each student is worked out individually.

Elective Courses

Advanced General Medicine. This course provides advanced training and experience in general medicine. The student is assigned to the inpatient and outpatient services to work up and follow general medical problems in close association with the house staff and consultants. This course will teach techniques of diagnosis and application of therapeutic programs. The student is responsible for the patient and will learn about disease and its management through the staff directly concerned with the patient, and through the consultant services which will assist in the diagnosis and care. Full time for nine weeks. Offered throughout the year. No limitation on student number. *Dr. Stead and Department of Medicine Staff*

Allergy and Chest Diseases. This course provides both an introduction and depth in the clinical and laboratory aspects of allergic and respiratory diseases. The student works up and follows the patients assigned to this service in both the outpatient department and in the hospital or in consultation. There is instruction in allergy and clinical immunology with seminars and conferences in more basic immunology in cooperation with the Department of Microbiology and Immunology. The student learns the techniques and interpretations of pulmonary function studies and may attend seminars and conferences in pulmonary physiology in cooperation with the Department of Physiology. Provisions are made for library or clinical research problems. Full time for nine weeks. Offered throughout the year. Limited to six students. *Drs. Sieker, Hansen, Menefee, Kilburn, Saltzman, Buckley and Staff*

Courses offered part time and in coordination with other basic science or clinical areas are: allergy clinic, chest clinic, clinical immunology

laboratory, pulmonary function laboratory, allergy and clinical immunology seminar, and respiratory disease seminar.

Behavioral Medicine. This course provides training in understanding and applying the principles of human behavior in managing patient problems in general medicine. The student works with and follows patients in the medical outpatient and inpatient divisions, being supervised by the senior staff and associate staff of the division. Emphasis is placed upon interpreting the natural history of illness and the patient's response to the illness, and upon utilizing the features of the individual's behavior as keys to the management of the clinical problem. There is a seminar and patient conference review of the basic science information relative to this area and a series of comprehensive seminars conducted with the Departments of Sociology and Psychology. Participation in clinical and laboratory research problems is part of the program. Full time for nine weeks. To be offered throughout the year. Limited to five students. *Drs. Bogdonoff, Klein, and Staff*

Cardiovascular Diseases. This course is primarily patient oriented, but allows the integration of problems in clinical evaluation and clinical care with those of more advanced laboratory investigation. The curriculum allows the student to develop a continuing relationship with one senior person in the cardiovascular division throughout the entire nine-week period. Since the division does offer a variety of learning experiences, the student may participate also in the forms of investigation and care which are the particular interests of the individual section of the cardiovascular division. The student is assigned a certain number of patients for evaluation and follows these patients through their specialized study, participating in the phonocardiographic and electrocardiographic studies as well as cardiac catheterization if this is indicated. There are a number of conferences and seminars, including a student working conference in which the student presents and discusses the pertinent data derived on the patients he is following. There is a student seminar in which selected topics are reviewed to provide more completeness and depth in a given area. The student also participates in the scheduled conferences and clinics. Opportunity is provided for participation in related seminars in pathology and physiology. Full time for nine weeks. To be offered throughout the year. Limited to six students. *Drs. Orgain, McIntosh, Floyd, Whalen, Estes, Wallace, and Staff*

Dermatology. This course is an introduction to dermatology, with emphasis on diagnosis and management of skin disorders based on the pathophysiologic and biochemical alterations in these diseases. Students are assigned to patients in the hospital and are responsible for their supervised evaluation and care. In addition, the student receives extensive experience in the private and public outpatient departments where he performs diagnostic and treatment procedures under the direction of the staff. Scheduled seminars and conferences provide opportunity for group

instruction. Although it is not the major emphasis of the course, interested students may participate in library, clinical, or laboratory investigation. Full time for nine weeks. Offered throughout the year. Limited to four to eight students. *Drs. Callaway, Smith, and Staff*

Gastroenterology. This course is designed to emphasize the role of the gastrointestinal tract and liver in general medical disorders, and to serve as an introduction to illnesses which primarily involve the liver and gastrointestinal tract. Experience is obtained from patients directly assigned to members of the senior staff as well as those seen through the private and staff consultation service in the outpatient gastroenterology clinic. In addition, the student rounds on all patients with the resident, fellow, and senior staff. He also participates or assists in the various techniques available in the laboratory for the diagnosis and evaluation of gastroenterological disorders. There are clinical conferences in cooperation with the Departments of Radiology and Pathology, weekly seminars concerned with the physiological and biochemical problems related to hepatic and gastrointestinal function, and the opportunity for library or clinical research in a specific problem. Full time for nine weeks. Offered throughout the year. Limited to four students. *Drs. Ruffin, Tyor, Dobbins, and Staff*

Hematology (Cancer). This course is intended to provide advanced training in diagnosis and management of hematologic disorders, including cancer in general. The student works up and follows patients in the inpatient and outpatient services. He participates in the special diagnostic studies and in the laboratory evaluation used in following these patients. There are seminars and conferences and the opportunity for library and clinical investigation in a particular problem area. Full time for nine weeks. Offered throughout the year. Limited to five students. *Drs. Rundles, Laszlo, and Staff*

Metabolism and Endocrinology. The student learns in depth the clinical and laboratory diagnosis of metabolic and endocrinologic disorders. He is responsible for the work-up and follows patients on both the inpatient and outpatient services. He participates in the special studies and gains experience in managing metabolic disorders under the supervision of the staff. In particular, experience is provided in the endocrinology laboratory and in radioisotope techniques. Full time for nine weeks. Offered throughout the year. Limited to four students. *Drs. Lebovitz, McPherson, Nicholson, and Staff*

Neurology. This course is intended to provide experience in the diagnosis and management of neurologic disorders. The student works up and follows patients on the inpatient and outpatient services. Experience is gained in the use of special techniques including electroencephalography. Opportunity is provided for library and clinical research. Full time for nine weeks. Offered throughout the year. Limited to six students. *Drs. Heyman, Pfeiffer, Brody, and Staff*

Renal Diseases. This course offers detailed instruction in the clinical and laboratory aspects of hypertension and nephrology. It provides the basic foundation for a physiological approach to the diagnosis and management of patients with renal disorders, abnormalities of fluid and electrolyte metabolism, and hypertension. The student assumes full responsibility for the complete initial evaluation and subsequent followup of both inpatients and outpatients. Through the laboratory facilities, the student becomes familiar with the clinical application of specialized methods for the evaluation of renal function. Active participation in specialty rounds, conferences, and seminars is required. Students are systematically introduced to the mechanics and therapeutic applications of hemodialysis and peritoneal dialysis, the diagnostic evaluation of the hypertensive patient, the physiological approach to disorders of fluid and electrolyte metabolism, elements of renal pathology (in cooperation with the Department of Pathology), and medical aspects of urologic surgery (in cooperation with the Division of Urologic Surgery). Although the primary emphasis is on education, the opportunity exists for limited participation in various research projects in clinical dialysis, immunologic aspects of renal disease or transplantation (in cooperation with the Division of Immunology), pathophysiology of renal disease, and the hormonal causes of hypertension. Full time for nine weeks. Offered throughout the year. Limited to four students. *Drs. Robinson, Gunnells, Kempner, Peschel, and Staff*

These courses may be scheduled to run concurrently with more extensive participation in other areas: hypertension-renal clinic, renal pathology seminar, renal physiology seminar, clinical specialty conferences, and laboratory course.

Rheumatology. This course is designed to provide experience in the understanding and care of patients with connective tissue diseases. Basic mechanisms are explored in light of current knowledge, and the student participates in all inpatient and outpatient activities. By working with patients assigned to him under staff supervision, he learns the clinical and laboratory techniques available to him for their diagnosis and care. Full time for nine weeks. Offered throughout the year. Limited to four students. *Drs. Persons, Jones, Kerby, and Staff*

Microbiology and Immunology

Professor N. Conant, *Chairman*; Professors D. T. Smith, J. Larsh, D. Amos, H. Willett, E. Day, J. Beard; Associate Professors S. Osterhout, R. Metzgar; Assistant Research Professor C. Zmijewski; Assistant Professors R. Burns, R. Wheat; Associate C. Buckley

Research Associates W. Boyle, H. Seigler, R. McCloskey; *Technical Associate* H. Craig; *Instructors* H. Nielson, J. Flanagan; *Fellows* R. Buckley, B. Hattler, P. Hutchin, R. Iswara, P. Thasnakorn

Required Course

The required course in Microbiology is given in the second term of the first year. An intensive study is made of the common bacteria, fungi, and viruses which cause disease in man. The scope of the laboratory course is reasonably wide and acquaints the student with all the methods and procedures employed in bacteriological laboratories. Most of the lecture time is devoted to the immunological and epidemiological aspects of infection. The instruction is designed to give the students a clear conception of: (1) how organisms gain entrance to the body, (2) the type of toxins which they produce, (3) the nature of the immune bodies which are produced by the host, and (4) the methods of preventing the disease by active and passive immunization.

Elective Courses

Microbial Physiology. A lecture and seminar course devoted to the physiology and comparative biochemistry of micro-organisms. Three hours per week of lecture, no laboratory. Students unlimited. Second term, two hours. *Dr. Burns*

Mycology. A lecture and laboratory course with emphasis on fungi which cause disease in man and animal. Month of July, four hours. *Dr. Conant*

Readings in Bacteriology and Immunology. Selected readings will be assigned students for survey and background information, with emphasis on recent classical research in the field which has advanced these areas of biology. Four units per semester, number of lecture hours undetermined, no laboratory. Limited to five students. First term. *Dr. Smith*

Parasitology. One lecture and three-hour laboratory period per week for eleven weeks. Second term. *Drs. Conant and Larsh*

Microbiology Seminar. Graduate students and staff meet weekly to discuss and review recent microbiological literature. One hour per week, no laboratory. Students unlimited. Both terms. *All members of the Graduate Staff*

Fundamentals of Immunology. A lecture course on general immunology including the following: nonspecific factors in immunity, nature of antigens and antibodies, antibody production, complement, serological methods, blood groups, autoimmune diseases, tumor, immunity, transplantation immunity, and hypersensitivity. Two hours lecture per week, no laboratory. Students unlimited. Second term.* *Drs. Amos, Day, Metzgar, and Zmijewski*

*Will be changed to first term in 1967.

Immunochemistry. The structure of antibody molecules. The nature of the combining site. The hapten as a molecular probe. Forces involved in antigen-antibody interaction. Specificity, avidity, and crossreaction of antibodies. Purification of antibodies. Antibodies as analytical reagents. Prerequisites: Fundamentals of Immunology or Biochemistry or Physical Chemistry or consent of instructor. Two hours per week of lecture, no laboratory. Students unlimited. First term. *Dr. Day*

Immunohematology. A lecture and laboratory demonstration course covering the serological, genetic and anthropological aspects of human blood groups, iso-antigens, and antibodies. Two hours lecture per week, no laboratory. Students unlimited. First term, alternate years, *Dr. Zmijewski*

Immunogenetics.* Production of inbred and coisogenic strains. Mutation and recombination in inbred animals and tumors. Genetic control of histocompatibility iso-antigens in tumors and normal tissues, and differential gene action in hybrids and tumors. Antigenic and immunological factors in homograft rejection, tests for genetic compatibility. Modification of the immune response by genetic or immunological procedures: tolerance, enhancement, and suppression of antigens. Two hours lecture per week, no laboratory. Students unlimited. Second term, alternate years. *Dr. Amos*

Tissue Immunology. An intensive and critical analysis of progress in a major branch of immunological research covering cancer antigens, the tumor-homograft reaction, and the immunotherapy of cancer. Prerequisite: consent of the instructor. Two hours lecture per week, no laboratory. Students unlimited. Second term, alternate years. *Dr. Day*

Seminar in Immunology. Selected topics on various aspects of immunology will be discussed. Seminars will be by students and faculty. One hour per week lecture, no laboratory. Students unlimited. First term. *Dr. Metzgar*

Advanced Microbiology. The nature of growth, composition, structure, and metabolism of the microbial cell, with emphasis on molecular, biochemical, and immunochemical aspects. Two hours. Second term. *Dr. Wheat*

The Immunobiology of Disease. A lecture-seminar course covering the inter-relationship of a variety of kinds of human disease processes in which alterations of immunity are well recognized and play a part in the disease process. Clinical and physiological changes which occur are correlated with the altered immunity. Emphasis is placed on the usefulness of a knowledge of basic immunology in the study of disease processes and the experimental approach to basic problems offered by selected disease states. One hour, twice a week. Second term. *Staff*

*Not offered in 1966-1967.

Neurologic Sciences Program

Operating Committee: Professors E. Busse, J. Harris, A. Heyman, G. Odom, T. Peele, E. Stead, D. Tosteson, F. Vogel, W. Wilson; Associate Professors W. Byrne, R. Carson, J. Goree

(*Neurology*) Associate Professor J. Pfeiffer; Assistant Professors G. Paulson, I. Brody; Associates C. Gerber, R. McMasters, J. Stiefel; (*Neurosurgery*) Assistant Professors S. Mahaley, B. Nashold, G. Tindall; (*Psychosomatic Medicine*) Professor M. Bogdonoff and Associate R. Klein; (*Cerebral Circulation*) Professors W. Young, H. McIntosh; Assistant Professors H. Saltzman, H. Thompson, R. Whalen; Associate R. Gorten; (*Neurophysiology*) Assistant Professor G. Somjen; (*Pediatrics*) Associate Professor J. Sidbury and Associate A. Renuart; (*Psychology*) Professor

I. Diamond and Assistant Professor L. Thompson; (*Neuroendocrinology*) Associate Professor C. Christian; (*Neuropathology*) Associate G. Klintworth; (*Neuro-Ophthalmology*) Assistant Professor W. Anderson, Jr. and Associate J. Gills; (*Physical Therapy*) Assistant Professor E. Flanagan

Fellow Y. Kong; *Chief Resident* M. Hatcher; *Assistant Residents* M. Basson, N. Brown, R. Brown, A. Gabor, P. Hathaway, G. Molinari, B. Tharp, R. Wilkins; *Intern* E. Stewart

The Neurologic Sciences Program was established in April, 1964, to integrate and enlarge the neurologic teaching and research facilities in the Medical Center. It is an interdisciplinary unit comprised of several preclinical and clinical departments whose interests are specifically related to the various neurologic sciences. Its purpose is to provide greater learning experience for the undergraduate student and more comprehensive opportunities for training and research at the graduate level. The Program is designed to train physicians and scientists who will have an understanding of the concepts and mechanisms of neurobiology and their particular application to the diseases of man.

The Program is directed by an operating committee composed chiefly of the Chairmen of the various departments of the Medical School related to the neurologic sciences. The staff members include personnel from ancillary divisions in the Medical Center such as Psychosomatic Medicine, Neurophysiology, Psychology, and Neurosurgery. Although each staff member has his individual teaching and research interests, all participate actively in joint conferences, ward rounds, and seminars given primarily for the undergraduate and graduate student interested in the neurologic sciences. These teaching activities are designed to provide the student with an understanding of the problems of clinical neurology as well as to introduce him to research experience which will serve as a foundation for future study of the nervous system. Selected areas of neurochemistry,

neurophysiology, neuropathology, and neuroanatomy are available for investigative studies.

The Program provides opportunities for neurologic training of resident physicians from the Departments of Medicine, Neurosurgery, and Psychiatry. Conversely, fellows and house officers in Neurology are assigned to various staff members for training in Neuropathology, Neuroanatomy, Electroencephalography, Pediatric Neurology, and Neurosurgery. Joint faculty appointments may be held in Neurology and in the other clinical or basic science departments to provide an integrated approach to the teaching and research training of the undergraduate and graduate physician.

Teaching ward rounds for students, fellows, and resident physicians are conducted by senior staff members of the Neurologic Science Program five mornings a week at Duke University Hospital and the affiliated Veterans Administration Hospital. Outpatient clinics are held twice weekly for follow-up care of patients discharged from the hospital and for treatment of new patients referred from other clinics or outside physicians. An extensive series of teaching conferences and seminars comprise an integral part of undergraduate and postgraduate training.

Obstetrics and Gynecology

Professor R. Parker, *Chairman*; Professors F. Carter, R. Creadick, W. Cuyler, W. Thomas; Associate Professors W. Cherny, C. Christian, C. Peete; Associate Clinical Professors E. Easley, R. Pearse; Assistant Professors M. Crenshaw, A. Christakos, V. Turner, G. Wilbanks; Assistant Clinical Professors T. Adkins, W. Graham, K. Podger; Associate C. Von Roebel; Clinical Associates T. Stokes, R. Williamson

Research Associates C. Jones, L. Kaufmann; *Clinical Lecturers* C. Flowers, L. Palumbo, R. Ross; *Clinical Instructors* F. Bowles, E. Rodwell; *Fellows* E. Long, J. Younger; *Residents* S. Atkinson, H. Huneycutt; *Assistant Residents* L. B. Baker, J. Carraway, G. Copeland, D. Halbert, W. Hall, J. Herring, Z. Newton, F. Nicks, C. Parker, P. Pearce, R. Seaton, A. Sobel, L. Walker, T. Wilson, T. Wyatt, R. Yowell

Required Courses

The first year student receives instruction in the fundamentals of obstetric and gynecologic history and pelvic examination during their course in Introduction to Clinical Medicine.

The second year student spends seven weeks in general Obstetrics and Gynecology. The student attends lectures, works daily in the general and special outpatient clinics, and is assigned patients on the obstetric and

gynecologic wards. Students sharing in patient care and in teaching exercises is required. Tutorials are held daily with the senior faculty encouraging student participation. Lectures, Clinical Conferences, Gynecologic Pathology Conference, Endocrine Conference, and Correlative Seminars are a part of his learning experience and are outlined below.

Lectures. For the student who desires didactic, clinically pertinent, information only in order to gain insight into and understanding of the effects of pregnancy, or diseases of the reproductive system, as they relate to his major field of interest. One hour four times weekly for nine weeks. Offered throughout the year. *Dr. Parker and Staff*

Clinical Conference. Difficult problems in diagnosis and management are presented for consideration and discussion. Current patients, from the wards and the outpatient department, are selected. Course in general obstetrics and gynecology is a prerequisite. Two hours twice weekly for nine weeks. Offered throughout the year. *Drs. Parker, Carter, and Staff*

Gynecologic Cancer. A survey of malignant disease in the reproductive system. The didactic portion of the course is supplemented by presentations of patients currently in therapy on the wards and in the Gynecologic Cancer Clinic. Three hours once a week. Offered throughout the year. *Drs. Parker and Wilbanks*

Pathology: Obstetrical and Gynecological. The primary emphasis is upon the gross and microscopic study of the removed tissues of the reproductive system, correlation of the findings with the clinical observations, and consideration of the implications as to the future well-being of the patient. General Pathology is a prerequisite. One hour once a week. Offered throughout the year. *Dr. Wilbanks and Staff*

Correlative Seminars. Exploration in depth of certain specific subjects both within the discipline and from some of the parameters. Discussions and presentations include disorders of other tissues and organ systems, and the influence upon and effects from pregnancy or gynecologic malfunction. One hour once a week. Offered throughout the year. *Staff and invited faculty*

Preparation for Practice. For students preparing for: (a) general practice, (b) Pediatrics, (c) General Surgery, and (d) Internal Medicine. Inpatient and outpatient duties as an intern in Obstetrics and Gynecology. Special lectures in obstetric management and office gynecology with emphasis on good practice techniques. Full time eighteen weeks. Offered throughout the year. Limited to five students. *Dr. Parker and Staff*

Research Training. For special students who desire fundamental training in research methodology in Obstetrics and Gynecology. Rotation will be provided through various laboratories. The student, by active participation in investigative projects, learns research techniques and methods as they apply particularly in Endocrinology, Cytogenetics, Cytology, Bacteriology, Chemotherapy, Maternal and Fetal Physiology, Toxemia,

and others. Full time for eighteen weeks. Limited to fourteen students. Offered throughout the year. *Dr. Parker and Staff*

The Infertile Couple. A didactic and clinical study of infertility in the human. Assigned reading of pertinent medical literature, both historical and current, is correlated with clinical observation in patients. The student is made familiar with testing techniques and the use of the required apparatus and instruments, and participates in the treatment of patients. Three hours twice weekly for nine weeks. Offered throughout the year except summer quarter. Limited to two students. *Drs. Peete and Christakos*

Human Embryology. For the student who desires a study of human growth and development in utero. In addition to assigned reading and lectures, pertinent gross and microscopic material shall be studied. Incorporates Developmental Anatomy, Physiology, Biochemistry and, as available, Developmental Pathology. Two hours twice weekly for nine weeks. Offered twice a year—fall and spring quarters. Limited to six students. *Dr. Cherny*

Genital Cytology. A comprehensive survey of clinical genital cytology. Special instruction is provided in preparation of material and interpretation of cytologic appearances. The general cytology library contains adequate resource material and current patient slides for study. Three hours twice a week for nine weeks. Limited to four students. Offered twice a year, fall and spring quarters. *Dr. Cuyler and Miss Kaufmann*

Gynecologic Bacteriology. Work in the Clinical Laboratory of Gynecologic Bacteriology is carried out to provide a basic knowledge of special techniques in aerobic and especially in anaerobic culture. Correlation is made with clinical findings in patients with gynecologic infections. Participation in basic research is expected. Four hours twice weekly for nine or eighteen weeks. Limited to four students. Offered twice a year, fall and winter quarters. *Dr. Carter and Mr. C. P. Jones*

Research Preceptorships. By individual arrangement with the faculty. Although research project assignments are the major undertaking, emphasis is maintained on the clinical implications and applications of the research.

Clinical Preceptorships. Primary emphasis on clinical applications of patient care. Teaching is done with current patients. Ambulatory treatment, ward rounds, and operating and delivery room experience is provided. By individual arrangement with faculty.

Endocrinology Seminar (Depts. Ob-Gyn, Medicine, and Pediatrics): Once-weekly sessions of one hour each with discussion of interesting clinical problems and related clinical and basic research. Taught throughout the year. *Dr. Christian from Ob-Gyn Dept. plus other members of divisions of Endocrinology*

Clinical Endocrinology. Elective course for students who desire additional clinical instruction in examination, diagnosis and treatment of



obstetric and gynecologic patients with endocrinopathy. Course consists of examination and treatment of patients in the Endocrinology Out-Patient Clinic. Two half days a week (four hours each day). Taught throughout the year. *Dr. Christian and Staff and Fellows of Endocrine Division*

Neuroendocrinology. Provides laboratory exposure in the current methods of neuroendocrine investigation, including stereotaxic stimuli and lesions, isotope localization, and immunochemistry of the ovulation-inducing hormones, as well as rounds on those endocrine patients pertinent to the topic. One nine-week course. Full time. Any quarter by special arrangement. *Dr. Christian*

Cytogenetics. For student who desires experience in depth of the genetic basis of disease. Course includes clinical studies as well as basic steps and procedures in cytogenetic research. Eight hours per week. Limited to four students. Taught twice yearly, summer, and winter quarters. *Dr. Christakos*

Developmental Biology. This course will represent a joint endeavor by the Departments of Obstetrics and Pediatrics with the help of members from the Departments of Anatomy, Biochemistry, Pathology, and Physiology. The student will explore problems of fertility and sterility, ovulation and implantation, placental transfer, fetal physiology and biochemical differentiation, and perinatal events and postnatal development. Examples for discussion will be drawn from the clinical material on the wards of Duke Hospital. Full time for nine weeks. *Drs. Crenshaw and Harris*

Clinical Problems in Maternal-Fetal Interaction. An obstetric-pediatric study of factors concerning the mother and infant during pregnancy, labor, delivery, and the first month of life. Emphasis will be placed on teratogenic influences, abnormal conditions of pregnancy as related to the infant, prenatal pathological conditions adversely afflicting the fetus and newborn in the prenatal area, and hospital and early home management of the infant, especially as related to parent-child adjustments. When possible, a family will be followed during the pregnancy and throughout the first month of the infant's life. Available to five students. Full time for nine weeks. *Drs. Crenshaw and Harris*

Ophthalmology

Professor J. Wadsworth, *Chairman*; Professor W. Anderson, Sr.; Clinical Professor Emeritus F. Stocker; Assistant Professor W. Anderson, Jr.; Associates A. Chandler, J. Gills; Clinical Associate S. McPherson

Research Associate G. Klintworth; *Instructors* E. Reese, G. Cousar, E. Gebel, W. Hull; *Clinical Instructor* L. Turner; *Clinical Assistant* T. Kerns; *Residents* G. Cousar, E. Gebel, W. Hull; *Assistant Residents* D. Driver, J. Foster, F. Hannah, J. Karickhoff, W. Lefler, J. Price, J. Trant, N. Young

Elective Courses

There are a number of elective courses available to those medical students who are especially interested in ophthalmology.

Investigative Ophthalmology. In this course, the student is assigned a project relating to basic science of ophthalmological problems. The student is provided with technical assistance, and the sufficient equipment and animals necessary for the completion of his problem are made available. Laboratory space will be available in both the fields of clinical research and basic investigation. The student will be expected to attend the lectures scheduled for the house staff. The course will be full time for a period of eight to sixteen weeks. This course will be limited to one student each eight-week period. *Drs. Gills and W. Banks Anderson, Jr.*

General Ophthalmology. The student will be expected to participate in

the regular house staff activities which include the instruction in the use of specialized apparatus generally used in the diagnosis and treatment of ophthalmic disease. The student will examine and treat patients in the outpatient clinic and may observe at frequent intervals in the operating room. He will be expected to attend the ophthalmology teaching rounds and clinics. The course will run full time for eight weeks and will be open to not more than two students in each eight-week period. *Dr. Chandler*

Medical Ophthalmology. The ophthalmic signs and symptoms of systemic diseases are presented by means of illustrated lectures. Such a course should be of interest to students in any field of clinical medicine. This course requires skill only with the direct ophthalmoscope. Emphasis is on the diagnosis of systemic diseases by the recognition of their ocular manifestations. Four hours, once weekly, for nine weeks. This course is limited to twenty students. *Dr. W. Banks Anderson, Sr.*

Basic Ophthalmic Sciences. This postgraduate course is designed primarily for those students intending to specialize in ophthalmology. This course covers optics, ocular anatomy, ocular physiology, ocular pathology, ocular pharmacology, and numerous ophthalmic diseases. Individual lectures are given by members of the senior staff of Duke University Medical Center as well as those from the North Carolina Memorial Hospital in Chapel Hill. Outstanding speakers from other medical centers will also lecture at frequent intervals. This course is given each Tuesday night from 7:30 to 9:30 during the academic year. *Dr. Wadsworth*

Refraction. The purpose of this course is to train students in the basic knowledge of refraction and the prescription for glasses. This course is full time for eight weeks and is limited to one student in each eight-week period. *Dr. Chandler*

Neuro-Ophthalmology. Experience is provided in the application of ophthalmic diagnostic techniques toward the diagnosis of central nervous system diseases. The use of special instruments helpful in establishing a diagnosis will be emphasized. Such a course is carried out in cooperation with the Divisions of Neurology and Neurosurgery. Eight hours, two days each week, for eight weeks. Limited to one student each period. *Dr. Gills*

Ophthalmic Pathology. Once weekly, the student reviews the ophthalmic pathology specimens submitted during the week and assists in collecting the case histories for presentation at the weekly ophthalmic pathology conference. Prerequisite for this course is either the course in General Ophthalmology or the course in Basic Ophthalmic Science. Four hours weekly for eighteen weeks. Limited to one student. *Drs. Wadsworth and Klintworth*

Ocular Diseases in Children. A special clinic for the study of ocular diseases in children will include such conditions as muscular imbalance and congenital diseases, as well as neoplastic diseases of children. Three hours weekly for twelve weeks. *Dr. Chandler*



Pathology

Professor T. Kinney, *Chairman*; Professors D. Hackel, N. Kaufman, J. Vazquez, F. Vogel; Professor Emeritus W. Forbus; Associate Professors B. Fetter, A. G. Smith, J. Sommer, B. Trump, B. Wittels; Assistant Professors P. Burkholder, J. Elchlepp, A. Musser, H. Sage, G. Spooner, W. Johnson; Associates R. Cole, G. Klintworth, I. Peacocke, A. Martin, M. Vazquez, B. Ashbrook

Research Associate W. Jurgelsky; *Technical Associates* C. Bishop, J. Pickett; *Fellows* J. Balentine, W. Bradford, B. Dick, A. Dudley, M. Fronstin, R. Guerry, D. Kroe, L. Ogden, J. Riddick, J. Rozwadowski, R. Quiroga; *Assistant Residents* C. Barringer, S. Butcher, F. Graybeal, H. Gerber, W. Kirsch, W. Latham, M. Leakan, J. Otis, R. Mathews, J. McCarter, W. Prioleau, N. Ratliff, B. Schlein, L. Taylor, J. Werner; *Interns* E. Bossen, J. Hasson, F. Morriss

Required Course

The required course in Pathology is given during the second term of the first year. The fundamentals of Pathology are presented to the student by a correlated study of gross and microscopic material illustrating the structural changes in disease. Lectures developing broad concepts of disease processes are given by the members of the senior staff. Conferences with small groups of students under the guidance of a staff member are scheduled for purposes of more intimate discussion. The emphasis is

placed on etiology and pathogenesis of disease and the experimental approach to an understanding of disease. Animal experiments performed either by students or by demonstrators are used to correlate functional and structural changes in disease. The group work is supplemented by weekly conferences involving the class as a whole and dealing with problems presented by current autopsies and with other problems of general importance. Student collaboration in postmortem studies is required. Cases thus studied are presented by the student before the class under the direction of the staff; this takes the form of a clinical-pathologic conference in which each student plays a particular role.

Elective Courses

The Pathologic Basis for Clinical Medicine. The study of disease will be approached by an examination of the pathologic processes as these affect the various systems and organs. An attempt will be made to orient the student in special pathology and to help him crystallize and apply the basic knowledge that he has acquired in the prerequisite Pathology course. The course will be organized with lectures, laboratories, and experimental demonstrations. Clinical pathologic correlations, including correlation with radiologic findings, will be stressed. The case method of teaching will be emphasized and material from current and past autopsies utilized. The systems to be covered are the cardiovascular system, endocrine, respiratory, gastrointestinal, genitourinary, female genital, hematopoietic, bones and joints, neuromuscular organs of special sense, and skin. Prerequisite: Pathology. Three hours, three times a week. Fall term. *Dr. Kaufman and Staff*

Basic Problems in Chemical Pathology. This is an advanced course in diseases of the cardiovascular system with particular emphasis on the heart. A seminar-tutorial system will be used to explore physiological expressions of morphological abnormalities of the heart. Specific problems in heart disease and experimental approaches toward solution of the problems will be discussed and dealt with. Two hours, once weekly. Fall term. *Dr. Wittels*

Advanced Neuropathology. Students will receive personal supervision in a detailed study of gross and microscopic neuro- and ophthalmologic pathology and in a review of neuroanatomy. They will assume limited responsibility for the performance of postmortem examinations upon patients with neurologic diseases. Opportunities will be provided for an introduction into research methods, notably electron microscopy, as utilized in investigations of the nervous system. Three hours, once a week. Spring term, alternate years. *Drs. Vogel, Klintworth, and Staff*

Ophthalmic Pathology. This course is designed for students with an interest in ophthalmic diseases and will consist of lectures, seminars, and laboratory sessions. The normal anatomy, embryology, and physiology of

the eye will be reviewed, and the various reactions of the eye to injury will be studied in gross and microscopic specimens. The more common diseases will be considered in detail. Three hours weekly. Third quarter, alternate years. *Dr. Klintworth*

Introduction to Immunopathology. This course is designed primarily for students planning to pursue postgraduate training in Pathology. The student is considered a full-time research fellow and will perform selected experiments in which he will utilize techniques of immunochemistry, immunohistochemistry, and morphology. In addition, the student will have the following scheduled appointments, twice a week: (a) formal lecture; (b) group discussion with staff; and (c) gross and microscopic morphology of selected human cases with immunopathologic conditions. The student will be given adequate time for library research and preparation assigned topics for verbal and written presentations. Four hours, once a week. Fall term. *Dr. Vazquez and Staff*

Exfoliative Cytology. This course will include study of available cells from various sources for diagnostic purposes. The identification of cell type, structure, and function will be done by applying various physical and chemical methods. Concomitant histological studies will be carried out. Particular emphasis will be given to diagnosis of malignant neoplasms. Experimental work and reviews of literature will be utilized as part of the study in this course. Three hours, twice a week. Second quarter. *Dr. Johnston*

Obstetrical and Gynecological Pathology. This course is designed for the student who is oriented toward obstetrics and gynecology. Classroom work in the first seven weeks will include a coverage of all diseases involving the pregnant and non-pregnant female genital tract. The last two weeks of the course will be devoted to the practical application of the acquired knowledge through the study of current materials. Two days of study will be devoted to exfoliative cytology of the female genital tract. The student will be expected to participate actively in all phases of the course. Three hours, three times a week. First quarter. *Dr. Fetter*

Neoplastic Disease. Theoretical problems and concepts in neoplasia will be considered. The pathogenesis of certain types of tumor will be studied and consideration will be given to etiologic factors such as genetic, viral, physical, and chemical. The influence of chemotherapeutic agents on neoplasia, both at the cellular and sub-cellular level, will be studied. Seminars and laboratory periods. Three hours, twice a week. First quarter. *Dr. Kinney and Staff*

Pulmonary Pathology. This course is designed for students with an interest in pulmonary disease. The various diseases of the lung, neoplastic, infectious, and others, will be evaluated in relation to pathogenesis and etiology. Anatomic alteration will be correlated with functional incapacity and with the clinical findings. Three hours, once weekly. Second quarter. *Dr. Kinney and Staff*

Pediatric Pathology. This course is designed to serve the interests and the needs of the students interested in Pediatrics. A wide range of diseases associated primarily with pediatric patients will be studied. An attempt will be made to correlate pathological findings with the clinical picture. Three hours, once a week. Third quarter. *Dr. Bradford and Staff*

Histochemistry and Cytochemistry. A wide range of histochemical and cytochemical observations in cells will be correlated with basic biochemical intracellular processes and the localization of these processes. The qualitative and quantitative alterations in the cells seen in disease states will be studied. The methods utilized in this course will be taught to students who will be expected to carry out the observations on materials which they have prepared themselves. Four hours, once a week. Spring term, alternate years. *Drs. Trump and Sommer*

Electron Microscopy in Pathology. This course is presented for those students who wish to broaden their basic knowledge of cellular structure and cellular pathology. Formal instruction will be designed to: (1) explain basic electron microscopic technique—its advantages and its limitations; (2) to interpret the rapidly accumulating body of electron microscopic studies in the literature; and (3) to review the areas where electron microscopy has made significant contributions to our understanding of pathology. The resources of the laboratory will be available to demonstrate the techniques of specimen preparation and the operation of the electron microscope. The students will have the opportunity to prepare and examine clinical or experimental pathologic material already on hand and to apply the information obtained through formal instruction. Seminars will be held to involve the students with their subject in depth. Four hours, once a week. Spring term, alternate years. *Dr. Trump and Staff*

Pathology of the Gastrointestinal System. This course will explore the diseases of the gastrointestinal system, including diseases of the liver and pancreas, in greater depth and breadth than available in other courses. A wide range of diseases of this system will be reviewed, and pathologic changes will be correlated with clinical findings and physiological and biochemical processes. Collected material available in the Department and current material from the autopsy service will be utilized. Material from surgical pathology will be used as it becomes available and the findings will be correlated with the clinical symptoms manifested by the patients on the ward. Diseases covered will be congenital, nutritional, neoplastic, infectious, and metabolic. Seminar and group teachings will be combined with laboratory periods. Three hours weekly. Fourth quarter. *Dr. Fetter and Staff*

Cellular Pathology. This subject and the objectives of this course will be introduced by a historical review followed by detailed demonstration, discussion, and, in the laboratory period, selected application of methods

of investigation in cellular pathology. Subsequently, the structural equivalent in individual cells of the injured function of total organs will be discussed. The final portions of the course will be devoted to the specific cellular pathology of viral, neoplastic, and other selected diseases as well as to diagnostic cytology. One hour, twice a week. Fall term. *Drs. Trump and Sommer*

Autopsy Pathology. The students will work directly with one of the members of the Pathology staff. They will first assist at autopsies and then perform a few selected autopsies. The emphasis will be on a very careful study of a small number of cases, selected to exemplify important pathologic processes. The examination of cases will include correlated reference to other cases on file in the Department and to appropriate current and old literature. Full time. Offered all year, including summer quarter. Limited to four students each quarter. *Staff*

Cardiovascular Pathology. This course will stress clinical correlation with pathologic problems in the cardiovascular system. The normal anatomy and embryology of the cardiovascular systems will be reviewed, including a consideration of the normal and abnormal conducting system and electrocardiogram. The various disease processes will be studied in detail, utilizing gross and microscopic specimens, examination of patients with similar diseases, and consideration of laboratory diagnostic techniques. Three hours, once a week. Second quarter. *Dr. Hackel and Staff*

Problems of Abnormal Growth and Development. A survey of experimental studies of genetic, chemical, and physical factors related to disorders of development and growth with review of normal embryonic and fetal development; induction and organizers; cellular differentiation and interaction; and development arrest, mechanism of action, and specificity of teratogenic agents. Two hours per week as seminar group. Each student to meet instructor individually for one hour tutorial per week. Summer quarter. *Dr. Elchlepp and Staff*

Methods of Study of Abnormal Growth and Development. Laboratory techniques in experimental embryology and teratology, including demonstrations of dependent differentiation, induction of malformations, production of chromosomal abnormalities, and karyotyping. Limited to five students. Prerequisite: concurrent enrollment in Problems in Abnormal Growth and Development. To meet as one three-hour laboratory period per week for nine weeks. Three hours per week. Summer quarter. *Dr. Elchlepp*

Research in Pathology. Independent research projects in the various fields of pathology. Time and credit to be arranged. Offered all year, including summer quarter. *Dr. Kinney and Staff*

Laboratory Medicine. This course will give the student understanding of the theoretical and practical bases of various laboratory procedures. Methodology and sources of error will be considered, and correlations

made between laboratory findings and physiologic and biochemical alterations in disease processes and in various disease states. The shortcomings and the benefits derived from the rational and critical utilization of laboratory procedures will be emphasized. This course will act as a bridge between the basic science and clinical science disciplines. The student will learn to evaluate present tests and procedures and their modifications and will learn to evaluate critically new procedures as they evolve and develop. The knowledge obtained previously in biochemistry, pathology, hematology, and microbiology will be drawn upon heavily in this course. The teaching techniques utilized will be seminars, tutorials, laboratory periods, and visits to the wards. Four hours, twice a week. Third quarter. *Dr. Musser and Staff*

Pathology of the Bones, Joints, and Related Structures. The various diseases of the bones and joints will be reviewed and studied. The course will be structured around seminars and laboratory periods when gross and microscopic material will be studied. Emphasis will be placed on the natural history of the lesion, pathogenesis, and correlation with roentgenographic, clinical, and laboratory findings. Three hours, once a week. Second quarter. *Staff*

Pathology of Urinary and Male Genital Systems. The main purpose of this course will be the detailed study of diseases of the urinary and male genital systems, correlating basic science, pathologic, and clinical aspects. The normal anatomy, embryology, and physiology of the kidney will be reviewed, and various congenital, inflammatory, neoplastic, toxic, and hypersensitivity renal diseases will be studied. Gross and microscopic specimens will be available and will be correlated with practical patient problems. A similar approach will be followed for the male genital system. A few selected animal demonstrations of pathologic processes will be performed, permitting some experience with immunopathologic and electron microscopic problems. Three hours, once a week. Third quarter. *Dr. Hackel and Staff*

Surgical Pathology. This course is designed for the student who wishes more experience in the study of disease. Although the course is entitled Surgical Pathology, this does not imply interest solely in the individual oriented to surgery. Examination of all tissues removed will be performed so that problems in Dermatology, Gynecology, Orthopaedics, General Surgery, Internal Medicine, and other specialties will be considered. The primary emphasis will be upon study of the removed tissues and correlation of these findings with the clinical observations. Each day's work will consist of three parts: (1) study of gross material; (2) study of microscopic sections; and (3) ward rounds. Limited to five students. Four hours, five times a week. Second and summer quarters. *Drs. Fetter and Smith*

Pediatrics

Professor J. Harris, *Chairman*; Professors J. Arena, S. Dees, A. McBryde, J. Sidbury, Jr.; Professor Emeritus W. Davison; Associate Professors W. DeMaria, F. Porter, M. Spach, R. Stempfel; Assistant Professor J. Fowler, H. Harris, L. Hohman, H. Lowenbach, A. Spock, T. Peele; Assistant Clinical Professors S. Cornwall, W. London; Associates J. Boineau, R. Canent, N. Enzer, J. Jones, E. Lamb, E. Long, A. Renuart; Clinical Associate G. Watson

Instructors H. Amey, R. Buckley, F. Eastwood, W. Farley, A. Levin, D. Lockhart, W. London, C. Neal, S. K. Osterhout, A. Rice, D. Shearin, B. Skinner, B. Webb; *Clinical Instructors* C. Bailey, J. Brewer, A. Johnson, T. Jones, J. Whatley; *Fellows* A. Asadi, H. Heick, V. Jain, W. Keiter, W. Rocha, L. E. Rogers, B. Sheikholislam, L. Warford, H. Whitaker, M. Willhide; *Residents* J. Hogg, M. Rourk, D. D. Smith; *Senior Residents* C. Ayers, R. Hale, R. Ray; *Assistant Residents* R. Bentley, B. Keenan, K. Lewis, G. Powell, W. Scroggie; *Interns* M. Andriola, J. Ashe, R. Krueger, J. Minus, B. Peacock, J. O'Donovan, A. O'Quinn, J. Powell, J. Rouse, C. Tweedy, W. Yancy, S. Zirkle

Required Course

The basic course in Pediatrics consists of seven weeks during the second year, the time being equally divided between clinic and ward services. Students participate in the morning subspecialty clinics, the well baby clinics, and afternoon general medical pediatric clinics, seeing both new and return patients. Conferences are held at the end of the following specialty clinics: hematology, metabolism, neurology, cardiorenal, allergy, convulsive disorders, behavior problems, endocrinology, and well baby care. There are conferences in the general pediatric clinic with informal presentation and discussion of patients. On the wards, the students assist as clinical clerks and are assigned patients in rotation. They make daily rounds with the staff. Pediatric nursing procedures are demonstrated by the nursing supervisor. The different subspecialty groups—cardiology, hematology, allergy, endocrinology, dermatology, and metabolism—make ward rounds weekly. A joint conference with the senior and resident staff is held twice weekly on topics of pediatric interest, clinicopathologic discussions, case presentation, and for guest lecturers. There is a weekly radiology conference at which the interesting cases of the week are presented and discussed with the radiologist. Each student prepares a paper on a pediatric subject of his own choosing which they present to the entire group in an informal discussion.

Elective Courses

General Pediatrics. The student will be assigned to the wards, clinics, and newborn nursery according to his interest and goals. In general, he will have an apprenticeship in Pediatrics with learning experiences stemming directly from the patient and his problems. Ten students. Full time, nine weeks. Offered every quarter. *Dr. Harris and Staff*

Pediatrics Neurology and Convulsive Disorders. The student will examine and discuss patients with neurological and convulsive disorders in the wards and clinics of Duke Hospital and in the inpatient facilities of the Murdoch Center. In Dr. Renuart's laboratory at the Murdoch Center, he will learn the techniques and significance of various screening tests for metabolic disturbance causes of mental retardation and convulsive disorders. Limited to two students. Full time, first and third quarters. *Dr. Renuart and Staff*

Mental Retardation. Survey of medical, psychological, social, and special educational aspects of mental retardation, including clinic evaluation and management approaches. Utilization of existing neurologic, endocrinologic, and child guidance clinic facilities, and field work at the Murdoch Center. Limited to three students. Full time, second and fourth quarters. *Dr. Renuart and Staff*

Pediatric Cardiovascular Disease. Two-thirds of the elective will be spent in clinical areas with close patient contact. An integrated approach will allow the student to work-up the patient on admission, participate in special diagnostic studies (e.g. cardiac catheterization), follow the patient to the operating room, and then participate in postoperative care. Students attend cardiology conferences, ward rounds, and special teaching sessions on electrocardiography, vectorcardiography, phonocardiography and cardiac catheterization. One-third of the elective time may be spent in special areas, such as electrocardiography, experimental surgery, or research. An active interchange of ideas will provide a strong catalyst for the student to view cardiovascular disease as it occurs in children, to obtain a concept of methodology and diagnosis, and to envision an approach to medical and surgical therapy. Limited to five students. Full time, all quarters. *Drs. Spach, Canent, and Boineau*

Pediatric Endocrinology. The student will gain broad exposure to clinical endocrine material through active participation in the operation of the Pediatric Endocrine Clinic and certain non-pediatric endocrine clinics within the Endocrine Division. Students will become acquainted with the techniques of metabolic studies performed on the Clinical Research Unit when patients with hormonal disturbances are available for investigation. Particular stress will be placed upon the application of methods of hormone assay and steroid measurement to the diagnosis of endocrine disorders in childhood. A series of biweekly endocrine seminars (one clinical and one basic) will be conducted for students, assigned house

staff, and fellows. In addition, participants will attend the regular conferences, seminars, and ward rounds of the Endocrine Division. Limited to four students. Full time, second and third quarters. *Dr. Stempfel and Staff*

Allergy and Pulmonary Diseases. An intensive course in the clinical evaluation, diagnosis, and treatment for all types of allergic problems in children such as eczema; asthma; allergic rhinitis; urticaria; food, drug, and bacterial allergies; collagen; autoimmune diseases; and immunological abnormalities. The clinical work is amplified by laboratory experiences, skin testing procedures, pollen identification, preparations of allergens, allergy vaccine, and appropriate immunologic tests. Students will see numerous patients with chronic lung disease, especially cystic fibrosis of the pancreas, and will utilize pulmonary function tests and blood gas analyses as they apply to the respective patients. The students will have an opportunity to see how other medical specialties such as Dermatology, ENT, Psychiatry, Endocrinology, Physiology, Physical Therapy, and Inhalation Therapy relate to the various allergic problems. Limited to six students. Full time, all quarters. *Dr. Susan Dees and Dr. Spock*

Developmental Biology. This course will represent a joint endeavor by the Departments of Obstetrics and Pediatrics with the help of members from the Departments of Anatomy, Biochemistry, Pathology, and Physiology. The student will explore the problems of fertility and sterility, ovulation and implantation, placental transfer, fetal physiology and biochemical differentiation, perinatal events, and early postnatal development. Examples for discussion will be drawn from the clinical material on the wards of Duke Hospital. Limited to three students. Full time, second and fourth quarters. *Drs. Harris and Christian*

Metabolic Disorders. The course will be open to students, preferably those who have or wish to start a laboratory project. The project may be in any laboratory but must have a bearing on normal or abnormal metabolism. There will be assigned reading, weekly seminars, weekly rounds in conjunction with interdepartmental groups interested in metabolic disorders, and duties in relation to inpatients and outpatients with metabolic disorders. Full time, each quarter. Limited to two students. *Dr. Sidbury*

Pediatric Hematology. The course will include all aspects of clinical and laboratory pediatric hematology with emphasis on fundamental concepts as related to hematologic disorders. There will be daily ward rounds, a weekly clinic, weekly slide conferences, and weekly seminars, as well as assigned reading. Students will be encouraged to engage in some individual clinical or laboratory project during the period of the course. Limited to two students. Full time, all quarters. *Dr. Porter*

Clinical Problems in Maternal-Fetal Interaction. An Obstetric-Pediatric study of factors concerning the mother and infant during pregnancy, labor,

delivery, and the first month of life. Emphasis will be placed on teratogenic influences, abnormal conditions of pregnancy as related to the infant, prenatal pathological conditions adversely afflicting the fetus and newborn, and early management of the infant, especially as related to parent-child adjustments. When possible, a family will be followed during the pregnancy and through the first month of the infant's life. Limited to five students. Full time, first and third quarters. *Drs. Christakos and McBryde*

Poison Control Center. The student will participate in all functions of the Center. He will be on-call for the treatment of these cases in the Emergency Room or ward and will help compile the monthly data, discussing each report with the Director. Seminars will be arranged with the Director and appropriate members of the University faculty (Pharmacology, Pathology, and Biochemistry). Limited to two students. Half time, all quarters. *Dr. Arena*

Preceptorship in General Pediatrics. The student will spend several days each week with selected practicing pediatricians or a group of associated pediatricians in Durham. He will participate in daily newborn-premature rounds at Duke and Watts Hospital, conduct well-baby conferences in the town of Durham and at Duke, and attend prenatal conferences and clinics with emphasis on observations of abnormal pregnancy. The aim of this course is to give the student insight into the management of well and ill children in an atmosphere which will prevail when he enters practice. Limited to three students. Full time, all quarters except summer. *Drs. Arena, McBryde, and Staff*

Newborn and Premature Infants. Students will have intensive experience in the newborn and premature nurseries. Included will be discussions of prenatal hazards, resuscitation, care of the normal newborn and premature infant, and pathological and normal psychological conditions occurring in the newborn and their treatment. Emphasis is placed on the initiation of parent-child relationships and of breast feeding. Limited to nine students. Full time, all quarters except summer. *Dr. McBryde*

Behavioral Aspects of Pediatric Illness. The students experience with children will include the impact on the family as well as the psychic and somatic adjustment of the child. Limited to six students. Second, third, and fourth quarters. *Drs. Jones, Stedman, and Staff*

Research Preceptorship in Child Development. Introductory experience in research and methods of investigation pertaining to behavioral and biological factors in infants and children. May include parent-child relationships, learning, motivation, personality, perception, cognition, psychophysiological processes, and statistical techniques in common use. This course is also listed as Human Behavior 313. Limited to ten students. Four hours per day, two quarters. Time to be determined. *Dr. H. J. Harris and Staff*

Physiology and Pharmacology

Professor D. Tosteson, *Chairman*; Professor E. Rekin, *Head of Division of Pharmacology*

Laboratories of the Division of Physiology:

(*Cardiopulmonary Physiology*) Associate Professor J. Salzano, Chief; Professor Emeritus F. Hall; Associate Professor E. Long; (*Cellular Endocrinology*) Associate Professor J. Kostyo, Chief; Assistant Professor R. Fellows, Jr.; (*Cellular Neurophysiology*) Professor J. Moore, Chief; Assistant Professor T. Narahashi; Research Associate N. Anderson; (*Cellular Transport Processes*) Professor D. Tosteson, Chief; Assistant Professor T. McManus; Research Associates C. Lee, M. Zinn, T. Andreoli; (*Cerebral Physiology*) Assistant Professor F. Jobsis, Chief; (*Integrative Neurophysiology*) Assistant Professor G. Somjen, Chief; Associates B. Renkin, C. Gerber; (*Molecular Physiology*) Associate Professor J. Blum, Chief; Assistant Professor G. Padilla; Research Associate V. Kahn; (*Muscle Physiology*) Associate Professor P. Horowicz, Chief; Associate R. Eisenberg; Research Associates D. Erlij, P. Gage; (*Clinical Physiology*) Assistant Professors S. Boyarsky, R. Stempfel, M. Dick, J. Kylstra; Associates R. Gorten, H. Thompson; Instructor J. Hijmans

Laboratories of the Division of Pharmacology:

(*Biochemical Pharmacology*) Professor F. Bernheim, Chief; Professor Emeritus G. Eadie; Associate Professor A. Ottolenghi; Research Assistant J. Utley; (*Cardiac Pharmacology*) Associate Professor E. Johnson, Chief; Research Associates W. Gay, P. Kuohung; (*Cellular Pharmacology*) Assistant Professor P. Hochstein, Chief; Associate N. Begin-Heick; (*Circulatory Pharmacology*) Professor E. Renkin, Chief; (*Molecular Pharmacology*) Assistant Professor L. Lack, Chief

Required Course

The required course in Physiology consists of lectures, seminars, and laboratory exercises offered by all members of the Physiology staff during the fall term of the first year. The core course in Pharmacology consists of lectures, seminars, and laboratories offered by all members of the Pharmacology staff during the spring term of the first year. These courses emphasize those facts and general principles of Physiology and Pharmacology which all medical students should learn no matter which of the many careers in medicine and the medical sciences they may choose to pursue.

Elective Courses

Tutorial in Physiology and Pharmacology. Required for all third and fourth year medical students who elect to concentrate in Physiology or

Pharmacology. Guided independent study of original literature leading to preparation of thesis. Laboratory work optionally assigned by tutor. Spring and fall terms, four quarters, four or more hours per week. *All members of Staff, every year*

Foundations of Contemporary Physiology. Topics that will be covered include: theory of diffusion in metabolizing systems; metabolic control mechanisms; photophysiology; osmotic equilibria and transport processes; properties of neurons; and properties of contractile systems. Prerequisites are core Physiology, Physical Chemistry, and one year of Calculus, or the consent of the instructor. Spring term, two quarters, four hours per week. *All members of the Physiology Staff, every year.*

Clinical Physiology. A seminar course in Human Physiology emphasizing the physiological basis of clinical medicine. Physiological principles are illustrated by examples from clinical cases. Fall term, two quarters. *Drs. Boyarsky, Gorten, Stempf, and Staff, every year*

Physiological Instrumentation. Deals with modern electronic methods of measurement of physiological variables. The necessity of understanding the physiological system in order to avoid possible interaction between it and the measuring system is emphasized. The concepts and use of feedback to make linear instruments and to perform numerous operations are used throughout the course. Specific topics covered include: passive elements and networks, potentiometric and currentometric recorders and amplifiers, data processing, and measurement of biological potentials, currents, pressure, and flow. Fall term, two quarters, two hours per week. *Dr. Moore and members of the Dept. of Electrical Engineering, every year*

Cellular Endocrinology. Current concepts of the mechanism of action of hormones are covered with special reference to the effects of hormones on cell membrane permeability and on the activity of enzyme systems. The relationships of these cellular actions of hormones to the hormonal regulation of growth, metamorphosis, osmoregulation, pigmentation, and reproduction are discussed. Spring term, two quarters, two hours per week. *Dr. Kostyo, 1967 and every other year*

Topics in Muscle Physiology. This course will cover the following topics: cellular basis of activity in skeletal, cardiac, and smooth muscle; ionic properties of muscle membranes; submicroscopic structure of muscle and the molecular basis of contraction; the problem of electro-mechanical coupling; the mechanics and thermodynamics of muscular contraction; and design and control problems for the production of movement in various animals. Spring term, two quarters, two hours per week. *Dr. Horowicz, 1967 and every other year*

Cellular Transport Processes. A sequential study of the following topics: the physical chemistry of transport processes which occur in living cells (e.g. diffusion, flow, and electric current), contemporary knowledge of the molecular mechanism of salt and water transport across cell mem-

branes, with special reference to the conversion of chemical bond energy to transport work in active transport, the integration of transport processes in individual plasma membranes to accomplish regulation of cytoplasmic salt and water composition and cell volume, and the secretion of fluids across epithelial cell layers in organs specialized for this function (e.g. intestines, kidneys). Spring term, two quarters, two hours per week. *Dr. Tosteson, 1968 and every other year*

Respiration and Aero-Physiology. A study of the fundamental respiratory processes in living organisms and of the special physiological responses and adjustments of individual during high-altitude flight. Lectures, conferences, and laboratory. Spring term, two quarters, two hours per week. *Dr. Salzano*

Physiology and Pharmacology of the Central Nervous System. A seminar course in the integrative functions of the central nervous system from simple reflexes involving the spinal cord to complex activities subserved by various regions of the brain. Spring term, two quarters, two hours per week. *Drs. Somjen, Renkin, and Staff, 1968 and every other year*

Reproduction. A lecture and laboratory course dealing with mammalian reproduction. The rat and rabbit will serve as the principal laboratory subjects. The following areas will be covered: embryology of the reproduction system; gonadal structure, gametogenesis and hormone production; structure and function of the diencephalic-pituitary system; structural, chemical, and behavioral actions of sex hormones; mechanisms of fertilization and implantation; placental structure and function; and lactation. Spring term, two quarters, four hours per week. *Drs. Kostyo and Everett, 1966 and every other year*

Cellular Metabolism and Energetics. The metabolic activity of cells will be considered from the point of view of the flow of energy through the cell. Special attention will be given to the mechanisms coupling the energy providing systems to the energy utilizing systems. Spring term, two quarters, two hours per week. *Dr. Jobsis, 1966 and every other year*

Cellular Neurophysiology. Deals with current concepts as to the structure and electrical impulse propagation in nerves. The powerful new experimental techniques used in the study of isolated membranes and the resulting theoretical models are covered. Adaptation of these models assists in the description of receptor and synaptic properties. The effect of cellular geometry on its function is considered. Spring term, two quarters, two hours per week. *Dr. Moore, 1968 and every other year*

Physiology of Cell Growth and Cell Development. Topics to be covered in this course will include: population kinetics; thermodynamics of growth; the timing of events of the cell cycle; and molecular aspects of mitosis and of the duplication of cell organelles. Spring term, two quarters, two hours per week. *Dr. Blum, 1967 and every other year*

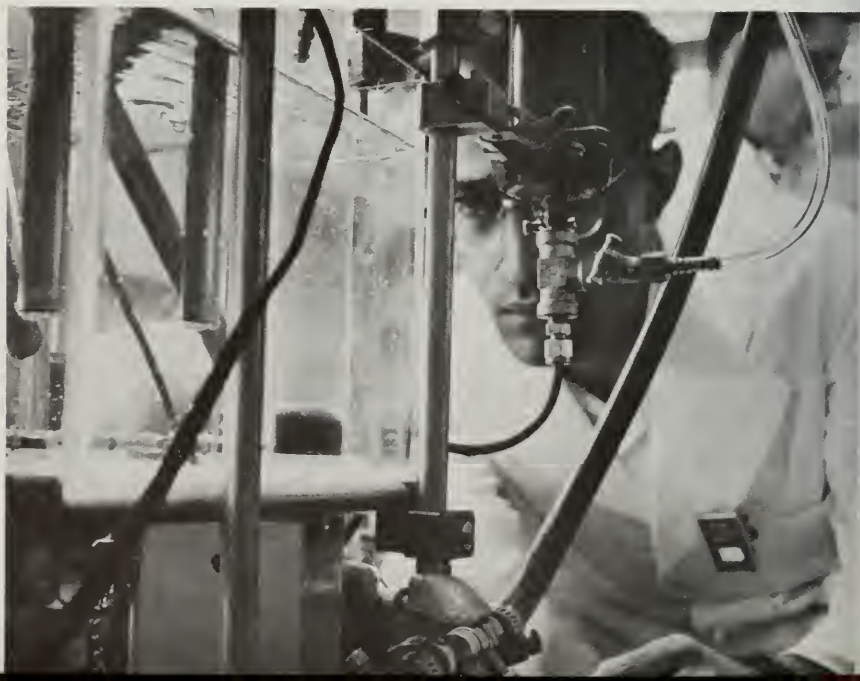
Foundations of Contemporary Pharmacology. Chemical and physical principles underlying drug action are discussed. The role of various molecular properties in determining the biological effects of compounds is emphasized. Fall term, two quarters, four hours per week. *Dr. Renkin and Staff, every year*

Circulatory Physiology and Pharmacology. A seminar course in the mode of distribution of drugs in the body. Special emphasis is given to the roles of blood flow and permeability factors in determining the rate and pattern of distribution. Fall term, two quarters, two hours per week. *Dr. Renkin, 1967 and every other year*

Cardiac Physiology and Pharmacology. A study of cellular activity in the heart and how it is modified by drugs. Consideration is given to excitation, conduction, and contraction of cardiac muscle fibers in the presence and absence of pharmacologically active compounds. Fall term, two quarters, two hours per week. *Dr. Johnson, 1966 and every other year*

Cellular Aspects of Drug Action. An introduction to cell-drug interaction emphasizing mechanisms of action and structure-activity relationships of chemical agents. Prerequisites: Organic Chemistry, introductory Animal or Plant Physiology. Undergraduates by permission of instructors. Fall term, two quarters, two hours per week. *Drs. Bernheim and Ottolenghi, 1966 and every other year*

Physiology and Pharmacology Seminars. A weekly meeting in which original researches by members of the staff and guests are reported. Required of all graduate students who are candidates for the M.A. or Ph.D. degrees. *All members of the Graduate Staff*



Psychiatry

Professor E. Busse, *Chairman*; Professors I. Alexander, K. Back, B. Bressler, S. Cohen, B. Dai, J. Fowler, H. Lowenbach, G. Maddox, J. McKinney, W. Obrist, J. Rhoads, W. Wilson; Professor Emeritus L. Hohman; Associate Professors J. Altrocchi, L. Borstelmann, J. Botwinick, R. Carson, C. Eisdorfer, I. Gehman, R. Green, H. Harris, F. Hine, M. Lakin, C. Llewellyn, C. Nichols, J. Preiss, B. Shmavonian, G. Silver, Assistant Professors W. Anderson, K. Barclay, E. Clifford, H. Crovitz, N. Enzer, B. Feather, P. Hein, M. Huse, C. Jones, C. Keith, I. Kremen, A. Krugman, M. LaBarre, D. Mayfield, S. Needell, J. Reckless, W. Spradlin, D. Stedman, L. Thompson, R. Tomlinson, A. Verwoerd, M. Wertz; Consultant W. LaBarre; Associates E. Corvitz, A. Dean, C. Duncan, L. Graham, F. Jeffers, D. Leventhal, D. Murphy, A. Powell, H. Wang

Staff, Highland Hospital, Asheville, North Carolina: Assistant Professors M. Baldwin, C. Norville; Associates T. Braganza, A. Sagberg; Psychiatric Social Workers, E. Harkins, D. Oestreich

Instructors M. Amaya, J. Ball, D. Day, J. Elmore, C. Erwin, D. Fowler, R. Funderburg, D. Gianturco, P. Irigaray, R. Kerr, M. Leventhal, H. Lineberger, B. Pope, M. Reedy, P. Walker, W. Zung; *Assistant* D. Heyman; *Fellows* L. Chou, S. Conna, H. Doerr, E. Ellinwood, O. Escalante, S. Lunzer, J. Martin, I. Talton, H. Wang; *Chief Resident* D. Gianturco; *Residents* R. Boren, C. Guajardo, T. Haizlip, J. Mallory, C. McRee, J. Repass, M. Short, G. Silverman; *Assistant Residents* G. Berken, O. Brodie, L. Bryskin, H. Chapa, R. Doyle, J. Gallemore, P. Glass, H. Goldman, M. Haas, R. Lioguri, J. Lovvorn, R. Martin, J. McNiel, B. Ogburn, G. Preston, C. Rich, S. Rubin, C. Shimm, M. Sottarelli, K. Thompson, O. Trick, A. Whanger; *Psychology Interns* J. Cataldo, N. Cherry, N. Duvall, A. Feinberg, M. Linder, L. Miller

Required Courses

Human Behavior and Psychiatry

In addition to required and elective courses in Clinical Psychiatry this Department offers, through its Division of Human Behavior, course work in the biological and behavioral sciences which form the bases of Psychiatry and the psychological aspects of medicine.

During the first year, 60 hours are devoted to human behavior. A lecture series introduces the student to the concepts, techniques, and data of the various sciences most relevant to an understanding of human behavior, thus providing a multifaceted approach to that understanding. Lectures from the fields of behavioral Neurobiology, Psychology, Psychiatry, Internal Medicine, and Sociology discuss behavior from the



points of view of heredity and constitution; the central and autonomic nervous systems; inner emotional conflicts and interpersonal relationships; learning, cognition, and perception; and relationships between the individual and his family, the social institutions, and his sub-culture and culture. Both functional and developmental points of view are presented and, in connection with the latter, stages in the development of the individual personality are traced. Wherever possible, relationships between the various approaches to human behavior are stressed. Concurrent with the lectures, a series of small group meetings provide, through the interviewing of patients and group discussion, opportunity for the further assimilation of the lecture material and its application to specific examples of behavior. The small groups also provide opportunities to introduce effective techniques of human interaction and observation of the primary data of human behavior as well as methods of recording and interpreting these observations. In both the didactic and small group

laboratory portions of the course, emphasis is placed upon the complementarity of the biological and psychosocial approaches to human behavior and the relevance of such a combined approach for the practice of medicine.

The required second year course in clinical psychiatry is for seven weeks. The student assumes limited responsibility, under supervision, for diagnosis and treatment of patients on the psychiatric wards, in the psychiatric outpatient clinic, and (through the psychosomatic consultation services) on the non-psychiatric wards of the hospitals. Supervision is directed toward two principle areas. The first is the significant application of concepts of diagnosis, psychopathological formulation, and therapy. Concepts in these areas are drawn from both the descriptive-organic-directive and the psychoanalytic-psychosocial-psychotherapeutic contributions to current psychiatric thought. Secondly, supervision is aimed at further developing interpersonal techniques of sensitive observation and therapeutic use of the self. Emphasis is placed upon concepts and techniques applicable to all patients as well as those specifically designated "psychiatric." Didactic instruction includes seminars on the principle neurotic conditions (symptomatic, characteriological, and psychophysiological), the major psychoses, emotional problems of childhood, the somatic therapies, psychological testing, and introductory electroencephalography. In addition to rounds and case conferences, students are encouraged to observe psychotherapy and participate in supervised psychotherapeutic encounters whenever appropriate situations can be provided.

Elective Courses

Human Behavior

Philosophy of Science and the Behavioral Sciences. A survey of current theories of knowledge, particularly as they relate to the special complex problems of empirical meaning, objectivity, measurement, and verification in studies of human behavior. Consideration is also given to the mind-body problem. Twice weekly for one and a half hours for one quarter. First and fourth quarters. *Dr. Hine*

Introduction to Behavioral Research. An intensive introduction to the logic and principles of experimental design and data processing in psychological research. Emphasis will be upon techniques of experimentation with molar behavioral variables and upon critical analysis of published research in psychiatrically relevant areas. Philosophy of Science and the Behavioral Sciences is a prerequisite. One hour, three times weekly for one quarter. Second and fourth quarters. *Dr. Carson and Staff*

Introduction to Statistical Analysis and Inference. An introduction to

probability theory and the use of descriptive and inferential statistics in scientific research. Topics will include measurement distributions, sampling, scaling, the concept of variance, correlation, and analysis of experimental data. The student will be introduced to the use of parametric and non-parametric techniques suitable for use with behavioral and biometric variables. One hour, three times weekly for one quarter. Third and summer quarters. *Dr. Carson and Staff*

The Biological Evolvement and Neural Basis of Behavior. A seminar surveying the biological bases of human behavior through discussions of imprinting; early mammalian affective development; classical and instrumental conditioning with particular emphasis on the autonomic nervous system; the psychological literature on RNA research; electrophysiologic correlates of higher mental processes including learning, memory, and perception; the relevant human and animal literature on EEG; and evoked potentials and microelectrode recording. Theoretical formulations based on communication theory will be presented. Three times weekly for one and a half hours for two quarters. To be given once per year. Time of year to be determined. *Drs. Shmavonian, Obrist, Spradlin, and Staff*

Human Behavior and Cerebral Dysfunction. This course will include a brief historical review of significant figures and trends of thought in the area of brain function covering the associationistic schools of thought, subsequent development of the reactionary field theories, and recent trends toward the revival of localization of function. Pathological conditions of the brain will be reviewed with emphasis upon how such conditions might differentially affect the structure and function of the nervous system. A presentation of the behavioral correlates of brain damage will be included. Focus will be on an examination of evidence for and against the regional localization of psychological abilities. The course includes five hours of assessment activity with brain-damaged patients. One hour, twice weekly for one quarter. Time of year to be determined. *Dr. Thompson*

Group Dynamics and Group Sensitivity Training. A series of seminars dealing with the data and theory of small group processes, plus a two-week sensitivity training experience whereby individuals learn about effects of interpersonal interactions and group processes through direct experience. Behaviors and feelings are discussed as these contribute to the development of a specific group culture. In encouraging self-awareness, the technique becomes an education device which offers potential for generalizing to other interpersonal situations. Permission of the instructor is required for participation in this course. One hour, once weekly for one quarter, plus daily one and a half hour meetings during a two week segment of the quarter. Time of year and number of times offered to be determined. *Dr. Lakin*

Personality Development of the Child, Adolescent, and Adult. A survey of personality development from pregnancy through old age, combin-

ing biological and psychodynamic approaches. Included are didactic presentations, discussions of assigned literature, and direct observations of, and interaction with, normal children and adults of various ages and in several settings. Two hours, three times weekly for one quarter. To be offered three times per year. Quarters to be determined. *Dr. Harris and Staff*

Comparative Personality Theory. An examination of representative models of human functioning from Freud to the present. Topics will include examples from psychoanalytic, interpersonal, field theoretical, and behavioristic approaches. One hour, three times weekly for one quarter. Quarter to be determined. *Dr. E. Crovitz*

Principles of Psychological Assessment. A theoretical and technical introduction to the measurement of individual differences by means of psychometric and projective approaches. The student is introduced to the theory of test development and application through an examination of such concepts as standardization, reliability, and validity. Exemplary assessment instruments are subjected to detailed analysis. One hour, three times weekly for one quarter. First and third quarters. *Dr. Huse*

Social and Cultural Aspects of Illness. A seminar on medically relevant social roles in an institutional context, the doctor-patient relationship, and the hospital as a social organization. Two hours, once weekly for two quarters. To be given once each year. Time of year to be determined. *Drs. Maddox or Preiss*

Experimental and Clinical Psychopathology and Psychophysiology Seminar. The aim of this Seminar is to examine clinically defined categories of psychopathology and experimentally produced analogues of clinical symptoms. Neurophysiologic, biochemical, sociocultural, psychodynamic, conditioned reflex, and developmental clinical and laboratory studies related to psychopathological symptom formation are reviewed and related to case material whenever possible. The emphasis is on developing testable explanatory concepts of clinical psychosomatic and psychopathologic symptoms, and on the integration of experimental research and clinical observations. Two hours, once weekly for two quarters. First quarter. *Dr. Cohen*

Research Preceptorship in Biological Psychiatry. This course will be comprised of selected experiments and instruction in experimental and clinical neurophysiology, physiology, and neurochemistry. The course content can be altered to include other subjects such as neuroendocrinology or neuropharmacology. Full time for two or three quarters; up to one half time may be used for didactic work in related courses. To be offered throughout the year. *Dr. Wilson*

Research Preceptorship in Child Development. Introductory experience in research and methods of investigation pertaining to behavioral and biological factors in infants and children. May include parent-child relationships, learning, motivation, personality, perception, cognition,

psychophysiologic processes, and statistical techniques in common use. (This course is also listed by the Department of Pediatrics.) Half time daily for one quarter. Offered throughout the year. *Dr. Harris*

Research Preceptorship in Social Psychology. Experience in the design and execution of medically relevant research involving small human groups in an experimental setting. Four hours per week for one quarter. To be offered alternate quarters throughout the year. *Dr. Back*

Research Preceptorship in Psychopharmacology. The student participates in a study of psychotropic drug action on patients and normal subjects, utilizing physiological and psychological measures. Five hours daily, four days weekly for one quarter. To be given throughout the year except summer quarter. *Dr. Reckless*

Research Preceptorship in Psychophysiology. Students can participate in clinical psychosomatic investigations or laboratory studies with humans or animals in physiology of stress, emotions and behavior, neurophysiology of conditional reflexes, and CNS effects of altered environments and pharmacological agents. Students would attend two weekly seminars in neurobiological and psychophysiological research be supervised in the use of bioelectrical measures of CNS and ANS activity; and instructed in design of psychophysiological research, statistical analysis of data, the use of analogue to digital conversion techniques, and the programming of data for computer analysis. Human Behavior and Psychiatry are prerequisites or must be taken concurrently with this preceptorship. Full time for a minimum of three quarters. Offered throughout the year by special arrangement with instructor. *Drs. Cohen, Shmavonian, Hein, and Graham*

Processes of Aging. Basic information on theoretical and experimental work in the field of aging will be presented by the investigators in many disciplines. Biochemistry, Medicine, Surgery, Psychiatry, Neurosurgery, and Neurophysiology will comprise the biological section. Psychology, Psychophysiology, Sociology, and Economics will comprise the behavioral section. The emphasis will be upon a broad base of current knowledge about the aging process. Students from any medical discipline are welcome. This course will be interdisciplinary in nature throughout. Two hours, twice weekly for one quarter. To be offered once per year. Time of year to be determined. *Dr. Busse and Staff*

Psychiatry

History of Psychiatry. A seminar tracing the origins and development of current psychiatric concepts and the influence and contribution of both psychodynamic and biologic orientations. One hour, once weekly for one quarter. Second and fourth quarters. *Dr. Spradlin*

Language, Communication, and Interviewing. An advanced seminar in interviewing, including verbal and non-verbal communication, formation

and resolution of patient resistance, and techniques in the control of the interview situation. Patient interviews and tape recordings will be employed. Two hours, once weekly for one quarter. First and third quarters. *Drs. Hein, Spradlin, and Green*

Psychiatry in a Community Context. A seminar on the epidemiology of mental health and illness and on organizational aspects of mental health facilities and services in the community. Two hours, once weekly for two quarters. Second and third quarters. *Drs. Maddox or Preiss*

Inpatient Psychiatry: Environmental and Somatic Therapy. An advanced clinical course in inpatient Psychiatry covering diagnosis formulation and therapeutic management including management of the ward milieu and utilization of nurses and ward personnel in therapy. The student's responsibilities for patient care and therapy are increased in accord with his abilities. Therapeutic Environments and Patient Care is a prerequisite or must be taken concurrently. Full time for one quarter. Offered throughout the year. *Drs. Green, Hine, and Staff*

Principles and Practice of Outpatient Psychiatry. This is the advanced clinical course in outpatient psychotherapy. Students will interview patients in the psychiatric outpatient clinic and present the findings of the intake interview at a daily conference where diagnosis and disposition are planned. Students will also be assigned to patients for psychotherapy under supervision by senior and resident staff. Attention will be devoted to the operation of a psychiatric outpatient clinic, its psychiatric teams, and the interaction of the clinic with community agencies and resources. In special cases arrangements may be made for continued supervised therapy beyond the single quarter. Half time (9:00 a.m.-2:00 p.m.). Four days per week for one quarter. Offered throughout the year. *Dr. Llewellyn and Staff*

Psychosomatic Medicine. This is the advanced clinical course in Psychosomatic Medicine which stresses the principles of the psychosomatic approach based on an integration of psychophysiology and psychodynamics illustrated through ward rounds and case conferences. The student assumes responsibility for selected, individually supervised patient care. Students may choose to concentrate on one specific area, e.g. Pediatrics, Obstetrics and Gynecology, Internal Medicine, and Surgery. If the two quarters course is elected, a clinical research project in Psychosomatic Medicine may be included. Ten hours per week to be arranged with faculty, one or two quarters. Offered throughout the year except summer quarter. *Dr. Cohen and Staff*

Psychosomatic Seminar. A seminar reviewing current concepts of body-mind relationships as they pertain to health and disease. Clinical material and a selective literature review are included. One and one-half hours, once per week for one quarter. Second and fourth quarters. *Dr. Green and Staff*

Special Topics in the Psychological Aspects of Medicine. A combined clinical and reading seminar intended to clarify the importance of various psychologically conceived variables in the practice of medicine. Included are psychological test dimensions, such as intelligence and abstracting ability, and dimensions of individual difference, such as perceptual and cognitive variables. Rounds are conducted to increase the student's awareness of behavioral dimensions in the physically ill patient and their relevance to patient care. Research preceptorships in this area are available following the completion of the structured course. One hour, three times weekly for one quarter. Time of year to be determined. *Dr. Eisdorfer*

Community Psychiatry and Mental Health. Students will participate in a seminar covering principles of the mental health consultation process with specific reference to the physicians serving it as consultants to individuals, groups, or agencies. The student will observe this process in action with a staff psychiatrist. Discussion will include the principles of preventive psychiatry, the structure of community organization, and the role of the psychiatrist and physician in helping the community find ways of meeting its mental health needs. Community resource people will be brought into these seminars when appropriate and field trips to community agencies will be arranged. Psychiatry in a Community Context is a prerequisite. Two hours, twice weekly for one quarter. First and third quarters. *Dr. Llewellyn and Staff*

Principles and Practice of Group Psychotherapy. The student will be given an introduction to the principles and application of group psychotherapy. He will observe groups in action and will participate in discussions of observed group processes. Two hours, twice weekly for one quarter. To be offered three times per year. Quarters to be determined. *Dr. Llewellyn and Staff*

Marriage Counseling in Medical Practice. A seminar dealing with the concepts of marital pathology, sexual behavior in marriage, neurotic interaction in marriage, and the reaction of marriage to stress. Techniques and methods of premarital and marital counseling will be discussed. Language, Communication, and Interviewing is a prerequisite. One hour, once weekly for two quarters. Time of year to be determined. *Dr. Llewellyn and Staff*

Schizophrenia: Research and Clinical Aspects. This literature seminar will review theories of the etiology of schizophrenia, including theories at the biological, individual psychodynamic, communication, and family dynamic levels, and concepts of management and treatment of the schizophrenic patient and the patient suffering from related conditions. One hour per week for two quarters. Time of year to be determined. *Drs. Tomlinson and Hine*

Clinical Electroencephalography. Instruction in technique and clinical aspects of electroencephalography. Included are didactic as well as prac-

tical instruction in EEG theory and interpretation. Research in clinical EEG may be included. It is recommended that this course be taken concurrently with courses in related areas. Eight hours, two days per week for two quarters. Time of year to be arranged. *Drs. Wilson, Green, and Staff*

Practice of Psychological Assessment Techniques. Demonstrations and opportunity for practice in the administration and interpretation of psychological assessment techniques with emphasis on the potential utility of these techniques to physicians. One hour, three times per week for one quarter. Time of year may be arranged. *Drs. Huse, Krugman, and Staff*

Mental Retardation: Birth to End of School Age. A survey of medical, psychological, social, and special education aspects of mental retardation, including clinic evaluation and management approaches. Use is made of existing pediatric, neurologic, endocrinologic, and Child Guidance Clinic facilities, and field work at the Murdoch School. (This course is also listed by the Department of Pediatrics.) Two hours, three days per week for one quarter. Time of year to be arranged. *Dr. Stedman and Staff*

Mental Retardation: Young Adulthood to Old Age. A survey of the biological, psychological, vocational rehabilitation, and employment aspects of the adult mental retardate. Included are management and planning with families and sociological problems. Two hours, three times per week for one quarter. Time of year to be arranged. *Dr. Stedman*

Emotional Problems of Childhood and Adolescence. This advanced clinical course in Child Psychiatry surveys major psychological problems of children and adolescents. The course consists of lectures, conferences, assigned reading, and supervised clinical experience in the Child Guidance Clinic. Half time. Five days per week for two quarters. Offered throughout the year. *Dr. Harris and Staff*

Institutional Resources for Children. A survey of institutional resources in our society for the education and care of children who have special needs. The course includes lectures, reading, discussion, field visits, and observation or supervised service to children in the Wright School, Umstead Hospital Adolescent Unit, Murdoch Diagnostic Clinic, and Child Psychiatry Unit. Two hours, three days per week for two quarters. Time of year to be arranged. *Dr. Harris and Staff*

Alcoholism. A combination of didactic material and contact with a variety of professional personnel and facilities involved in the therapeutic management of persons presenting an alcohol-related problem. Two hours, once weekly for one quarter. To be offered twice yearly. Time to be arranged. *Dr. Maddox and Staff*

Social Structure and the Life Cycle: The Adolescent. A combination of didactic material and clinical experience integrating medically relevant social, psychological, and physiological aspects of an important developmental stage. Two hours, twice weekly for one quarter. To be given twice yearly. Time to be determined. *Drs. Keith and Maddox*

Social Structure and the Life Cycle: The Aged Person. A combination of didactic material and clinical experience integrating medically relevant social, psychological, and physiological aspects of another important developmental phase. Included are discussions of the cerebral physiology of senescence and the relation of impaired cerebral physiology to mental function in old age. Two hours, twice weekly for one quarter. Time of year to be arranged. *Drs. Busse, Maddox, Obrist, and Staff*

Geriatric Psychiatry. The course will include lectures, supervised literature review, and clinical work in a variety of settings—inpatient and outpatient Psychiatry, private and public hospitals, and interviews with subjects in retirement homes and in a project concerned with psychiatric factors in the lives of community residents. The focus will be upon geriatric psychiatric diagnosis and management. This course is intended for senior students interested in Psychiatry as a career. It is advisable but not required that the individual will have taken the course Processes of Aging in the junior year. Research preceptorships in this area are available. Four hours, twice weekly for one quarter. Offered throughout the year. *Dr. Busse and Staff*

Preceptorships in Clinical Psychiatry. By personal arrangement with members of the clinical staff, it is possible for students to participate, in varying degrees, in the professional life of clinical psychiatrists. *Various members of the Clinical Staff*

Preceptorships in Clinical Psychiatric Research. Preceptorships may be oriented more toward the participation in, or conduct under, supervision of clinical research projects. *Various members of the Clinical Staff*

Radiology

Professor R. Lester, *Chairman*; Administrator C. Warren; (*Radiodiagnosis Division*) Professors G. Baylin, R. Reeves; Associate Professors W. Barry, J. Goree; Assistant Professors M. Capp, I. Johnsrude, S. Kim, R. Rice; Associates J. Chen, J. Jimenez, A. Mangum, D. Seim; (*Radiation Therapy Division*) Associate Professor P. Cavanaugh, Director; Associate Professor B. Worde; Assistant Professor M. Raben; (*Radiobiology Division*) Associate Professor A. Sanders; (*Nuclear Medicine Division*) Associate Professor J. Goodrich, Director; Assistant Professor F. Pircher; (*Radiation Physics Division*) Assistant Professor A. McCrea; (*Radiation Technology*) Assistant Professor J. Cahoon, Director; (*Clinical Staff*) Associate Clinical Professor O. Doyle; Assistant Professor W. Sprunt, J. Sherrill, G. Schlase-man; Clinical Associates D. Monson, T. Thurston, J. Wear, S. Patrick, C. Gray

Residents W. Bennett, R. Bradbury, J. Carranza, H. Connell, S. Forbis,

M. Grimmett, P. Howerton, R. Jordan, R. McConnell, B. Meares, J. Mikell, H. Piedad, A. Robinson, R. Thomas, L. Totten

During the first two years, Radiology is not taught as a separate course but is correlated in many of the established teaching programs. In the first year, this occurs in anatomy, clinical pathology and physical diagnosis and in the second year in collaboration with the clinical services. Therapeutic Radiology is taught in a similar manner. Particular emphasis is given during tumor clinics and conferences. The Nuclear Medicine Division teaches mainly on the postgraduate level.

X-Ray Elective. This particular aspect concerns the application of roentgenology to clinical diagnosis. In this phase the student will spend the entire working day in the Department of Radiology to observe the various departmental members in their activities. Thus the student will participate in the fluoroscopic studies of the gastrointestinal tract and the heart and lungs, and will follow through certain of the angiographic studies. He will audit routine film readings and thereby participate intimately in the various solved and unsolved problems which arise daily within the Department. He will attend the various departmental conferences held in conjunction with numerous other clinical divisions. This is limited to three to five students for a period of nine weeks, five days a week. All quarters except summer. *Radiology Staff*

X-Ray Diagnosis. This course will explore systematically the pathodynamics of roentgen changes as these particular aberrations relate to clinical medicine. This general systems review emphasizes the cardiovascular, pulmonary, and abdominal areas. Certain basic principles will be stressed with no attempt to encompass the entire fields of diagnosis. Two one-hour sessions each week for nine weeks. Preferably limited to fifteen to twenty students to allow significant time for discussion. All quarters except summer. *Radiology Staff*

Pediatric Radiology. This course is for students and pediatric house staff who wish more experience in the radiological study of pediatric disease. Daily examination of all films of patients is done with clinical and radiological opinions given and special instruction to the students on the service. The primary emphasis is on the value of radiological studies in making a more definitive clinical diagnosis. One hour daily four times per week for nine weeks. All quarters. *Drs. Lester and Capp*

Radiation Therapy. This course provides additional experience in the study and treatment of malignant disease and certain benign conditions. The interest does not lie solely in therapy. The best interests of the patient are considered in the individual case problems discussed. The role of consultation and care for every cancer patient is stressed and the co-operation of radiologists and surgeons is impressed. Each day's work con-



sists of a general discussion of one area at a time and, when possible, patient demonstrations. This is a one-hour seminar weekly for nine weeks. All quarters. Drs. Cavanaugh, Worde, and Raben

Surgery

Professor D. Sabiston, *Chairman*

Division Chiefs: (*Urologic Surgery*) Professor J. Glenn; (*Orthopaedic Surgery*); Professor L. Baker; (*Otolaryngology*) Professor W. Hudson; (*Neurosurgery*); Professor G. Odom; (*Plastic and Maxillofacial Surgery*) Professor K. Pickrell; (*Thoracic Surgery*) Professor W. Sealy; (*General Surgery*) W. Shingleton; (*Anesthesiology*) C. Stephen; (*Dentistry*) N. Ross

Professors C. Gardner, B. Woodhall, W. Anlyan, E. Alyea, J. Beard, S. Boyarsky, I. Brown, J. Dees, S. Dent, W. Eagle, N. Georgiade, J. Goldner, K. Grimson, R. Postlethwait, G. Quinn, J. Semans, W. Young; Professor Emeritus D. Hart; Associate Professors D. Amos, R. Bonar, F. Clippinger, M. Dillon, R. Gregg, K. Hall, W. Peete, W. Smith; Assistant Professors R. Atkinson, F. Bassett, R. Chen, D. Greenwood, J. Harp, P. Kenan, C. King, N. Kirshner, E. Lilly, Z. Lucas, M. Mahaley, D. McCollum, B. Nashold, D. Stickel, G. Tindall, D. Silver, L. Woods; Assistant Clinical Professors J. Davis, G. Ferguson, W. Hollister, L. Mason, W. Wentz, E. Bugg, Jr.; Associates D. Beard, R. Massengill, B. Sapp, S. McDowell, R. Snider, V. Vartanian; Clinical Associates M. Bourgeois-Gavardin, R. Coonrad, J. Glasson, J. Kouns, E. Lloyd, H. Schiebel, N. Schupper, C. Patterson, S. Kapoor, E. Staub

Research Associates R. Bender, R. Georgiade, U. Heine, E. Hlavayova, P. Labay, T. Maag, P. Rao, M. Thiele; *Clinical Lectures* L. Meyer, G. Miller, O. Miller, W. Roberts, F. Stelling; *Instructors* E. Anderson, M. Campbell, J. Fortune, B. King; *Clinical Instructors* D. Boyer, G. Carver, H. Deaton, R. Musgrave, J. Coppridge, S. Hobart, J. Hughes, G. Lazenby, L. Roberts; *Fellows* A. Acinapura, W. Ahlgren, H. Azuma, R. Bradham, R. Cline, P. Cooper, R. Ensor, J. Fenning, W. Gay, S. Ikeda, J. Porter, H. Ruskin, K. Tsuji, J. VanZyl, W. Wolfe, J. Yoon; *Residents* W. Butterfield, W. Caviness, J. DuBose, R. Estes, H. Ewy, T. Giblin, J. Gillespie, R. Hammonds, C. Harris, P. Henson, H. Heywood, E. Strong, R. Vieth; *Assistant Residents* B. Allen, J. Angelillo, J. Arriaga, W. Atwill, Q. Ayscue, J. Brown, J. Burnam, C. Claxton, W. Cook, N. Cooper, C. Cox, R. Crown, S. Dixon, J. Dodson, J. Dunn, W. Edwards, D. Ferlic, H. Ferrari, R. Flemma, L. Fort, J. Fuchs, R. Fuson, W. Garrett, T. German, R. Gingrass, F. Grover, B. Hattler, G. Henderson, T. Hetherington, J. Holsinger, J. Kapp, B. Karrel, J. Kelly, D. Knize, R. Knott, J. Lee, W. Lehmann, W. Leitner,

C. Lincoln, R. Mathog, R. Mathews, F. Mauney, R. McCullough, A. McElroy, R. McGraw, F. Miller, R. Mladick, G. Moor, D. Mullen, R. Nasca, H. Oldham, M. O'Neil, D. Paulson, D. Pearsey, M. Pomerantz, B. Rambach, D. Rose, J. Seabury, A. Secrest, D. Slaughter, M. Small, M. Stephens, D. Stowe, R. Taniguchi, R. Terrell, L. Thompson, F. Thorne, T. Tsushiya, J. Ware, C. Weber, R. Wilkins; *Interns* J. Adkins, D. Bigner, S. Boone, B. Brient, J. Emlet, L. Flint, R. Frothingham, M. Gorman, J. Harrelson, R. H. Jones, B. Lucas, F. McGregor, G. Odom, Jr., J. Partrick, K. Ramming, L. A. Rogers, W. Sternbergh, C. Wright

Required Courses

The required course in Surgery is given during the second year for a seven week period. Students will be assigned patients on the surgical wards for diagnosis and management. In this course attention will be directed toward basic principles in Surgery including diagnostic methods and pre- and post-operative care. *Dr. Sabiston and the Surgical Staff*

Elective Courses

Basic Clinical Surgery. This course is designed to teach the basic principles and concepts of Surgery, including surgical physical diagnosis and diagnosis of the acute abdomen, and will include the diseases of the gastrointestinal tract, endocrine organs, proctology, and surgery of the hernia. Primary emphasis will be on diagnosis, and students may assist in various operative procedures. The course is nine weeks and will be offered twice yearly. Limited to ten students. *Drs. Shingleton and Peete*

Survey of Pulmonary, Esophageal, and Cardiovascular Surgery. This course is a continuation of the students' clinical clerkship with emphasis on thoracic disease. The student will be assigned patients and will be responsible for the clinical history, physical examination, and the pre-operative studies. He will scrub at the time of operation and will assist in his postoperative care. Attendance is required at daily rounds with the staff. Assigned reading in this field will be required of each student. The course will require the students' full time for nine or eighteen weeks. All quarters. This course will be limited to five students. *Drs. Sabiston, Sealy, Brown, Young, and Resident Staff*

Surgical Aspects of Pulmonary Disorders. The student will be given a more detailed study of pulmonary disease. There will be three parts to the course. The first will be clinical with assignment of one patient per week for examination and follow-up. The student will be required to search the recent literature concerning the patient's problem and include a brief summary of pertinent references with each. The second part will be concerned with clinical pulmonary function measurements in patients with pulmonary disorders and will be conducted by Dr. H. O. Sieker of

the medical service. This will require two afternoons per week, four hours each. The student will be expected to participate in actual measurements of pulmonary function in patients coming to this laboratory, and will be assigned required reading relating to this phase of physiology. In the third phase the student will be assigned to the animal laboratory for four hours per week. Duration of course, full time, nine weeks. Limited to three students. *Drs. Sealy, Brown, Young, and Resident Staff*

Surgical Cardiology. The student will be introduced to the various aspects of the surgical treatment of cardiovascular disease and the course is divided into several component parts. First will come the introduction into the techniques of diagnosis, and two periods each week will be spent either in the pediatric or medical cardiovascular laboratory assisting in the clinical evaluation of patients. The student will be taught the basic concepts of extracorporeal circulation by assisting in the operating room with the conduction of open heart operations. In the second part clinical studies will be afforded by examination and follow-up of the patients. In addition, the students will be expected to carry out the various measurements of blood gases and to be familiar with these techniques. Duration of course, nine weeks, two days of four hours each per week in the cardiopulmonary laboratory; and four hours (one day per week) in the animal laboratory. The remainder of the time will be spent in the operating room and in the care of patients. Number of students two to four. *Drs. Sabiston, Sealy, Brown, Young, and Resident Staff*

Neoplastic Diseases in Surgical Practice. This course is designed for study of patients with a variety of tumors, including those of the gastrointestinal tract, soft tissue sarcomas, melanoma, and carcinoma of the thyroid and other endocrine glands. The students will assist in operations on these patients, as well as in their pre- and post-operative care, and will be allowed to follow patients with these diseases in the private and public outpatient clinics. Diagnosis of malignant tumors and methods of treatment other than chemotherapy will be stressed. The course is nine weeks and will be offered once yearly. Limited to five students. *Drs. Shingleton, Postlethwait, Peete, and Lucas*

Chemotherapy of Malignant Tumors. This course teaches basic approaches to chemotherapy of cancer. It includes lectures three times weekly in which systematic presentation of the chemotherapeutic agents, their biochemistry, and mode of action are presented. The student will have a laboratory exercise in experimental transplantable tumor in animals including treatment with a chemotherapeutic agent. The clinical application of chemotherapeutic agents in the management of cancer, as studied in patients in the private-public surgical outpatient clinics, will give the student first-hand knowledge of the clinical application of these drugs. The course continues for nine weeks and will be offered once yearly. Limited to eight students. *Drs. Shingleton, Byrne, Laszlo, and Mahaley*

Homotransplantation of Organs. This course will acquaint students with certain basic immunological aspects of homotransplantation of organs and will provide certain background information related to basic concepts in transplantation of tissues and organs. The course is nine weeks and will be offered once yearly. *Drs. Stickel and Amos*

Surgical Diseases of Peripheral Blood Vessels and Lymphatics. This course will acquaint the student with newer techniques and diagnosis and management of peripheral vascular disease, including diseases of the arteries and veins and of the lymphatics. The students will assist in the performance of such diagnostic procedures as lymphangiography and angiography. They will be assigned ward patients with these diseases and will follow such patients in the surgical outpatient clinics. The course is nine weeks and will be offered once yearly. Limited to five students. *Drs. Silver and Anlyan*

Surgery for Hypertension and Arteriosclerotic Disease. This course covers broad aspects of essential hypertension, drugs, sympathectomy, renal vascular hypertension, pheochromocytoma, adrenal cortical tumors, and diseases of the cerebral, coronary, renal, and aortic vessels caused by arteriosclerosis and requiring direct arterial surgery. Students will be assigned to the diagnostic laboratories to study patients with these diseases and to participate in their diagnosis and assist at the time of operation. Students will be assigned to the outpatient clinic to view the post-operative results achieved in these patients. The course is nine weeks and will be offered once yearly. Limited to six students. *Dr. Grimson*

Surgery of Trauma. This course teaches the principles and practice of diagnosis and management of the acutely traumatized patient. Students will be assigned to the Duke Hospital emergency and recovery rooms and will assist in diagnosis and treatment of assigned patients with acute injuries. Lectures and seminars will be held in a coordinated plan to cover trauma of general surgery. The course is nine weeks and will be offered once yearly. Limited to five students. *Drs. Postlethwait, Shingleton, and Peete*

Basic General Surgery. This course is designed to include the basic aspects of the major surgical diseases and is given at the Veterans' Administration Hospital. Patients will be assigned to the students and time provided to assist at operations. The major emphasis, however, will be on physiologic and pathologic changes, diagnosis, and the indications for operation in these diseases. Special attention will be given to those subjects in surgery common to all medical practices such as the acute abdomen. Full time, nine weeks. All quarters except summer. Minimum ten and maximum twenty students. *Drs. Stickel, Postlethwait, Dillon, Woods, Lucas, and Resident Staff*

Surgical Subspecialties. This course is designed to give a reasonably thorough study of the surgical subspecialties and is given at the Veterans' Administration Hospital. Ophthalmology, Otolaryngology, Neurosurgery

Orthopaedics, Plastic Surgery, and Urology are included. Patients on these services will be assigned to the students and an opportunity provided to assist at operation. Emphasis, however, will be given to diagnosis and pathophysiologic alterations. Full time, nine weeks. All quarters except summer. Minimum ten and maximum twenty students. *Drs. Boyarsky, McCollum, Tindall, and Resident Staff*

Pediatric Surgery. The principles of diagnosis and management of surgical diseases of the newborn and of surgical childhood diseases. Students will be assigned to surgical patients on the children's ward for participation in their diagnosis and management of surgical disease. A coordinated group of lectures will cover the general aspects of pediatric surgery. The course will run for nine weeks and will be offered once yearly. Limited to five students. *Dr. Silver and members of the Surgical Staff*

Medical and Surgical Renal Disease. This course will combine experience and instruction in medical and surgical diseases of the kidney and urinary tract, and will be taught jointly by the Division of Urologic Surgery and the Division of Medical Renal Diseases. Students will participate in the pyelonephritis clinic, hypertension clinic, and general urology clinic. Teaching rounds will embrace clinical and experimental problems in renal function, hemodialysis, renal transplantation, urinary infections, renal hypertension, obstructive uropathies, nephritides and other congenital and acquired diseases of the urinary tract which are of mutual concern to the internist and urologist. Eight hours, five days weekly for nine weeks. Offered twice yearly. Limited to six students. *Drs. Glenn, Robinson, Gunnell, Boyarsky, Peschel, and E. Anderson*

Investigative Urology. Selected students are given an opportunity to participate in an established program of urologic investigation, dealing with physiology and pathology of the genitourinary system. Both independent and integrated research will be encouraged. Methods and techniques of experimental animal surgery will be taught, and students will be afforded an opportunity to study renal, ureteral, vesical, and urinary diversion; renal hypertension; pediatric urology; and urologic endocrine-pathies. Students with interest in any area of clinical surgery are encouraged to participate. Four hours, six days weekly for nine weeks. Offered continuously. Limited to four students. *Drs. Glenn, Dees, and Staff*

Basic Neurosurgery Course. Those disease conditions which are commonly encountered in a neurosurgical practice are presented. A clinical presentation of a common neurological disorder such as brain tumor and head injury is made by a member of the staff in neurosurgery. Clinical features and a plan of diagnostic investigation are stressed. The clinical disorder is then used as a focal point from which to carry the presentation into the basic science area related to the clinical problem. For example, the neuropathologist will discuss the pathology of brain tumors after the clinical features of the condition have been covered by the

neurosurgery staff. Occasionally, related clinical disciplines will discuss the clinical problem being presented. Two hours each week for nine weeks. Offered three times each year. Limited to twenty students. *Neurosurgery Staff and Staff of related subspecialties including Neuropathology, Neuroanatomy, Neurology, and Neuroendocrinology*

Clinical Neurosurgery. This course is designed for those students with future interest in the neurological sciences. The student becomes in practice an extern on neurosurgery as he rotates through the neurosurgical service with essentially the same responsibilities as an intern. Duties include the work-up and care of inpatients, work-up of clinic patients, assistance in the operating room, routine postoperative care, daily rounds, and night call. The student is expected to attend the weekly conference in neurology, neuropathology, and neuroradiology, and to attend the neurosurgery lecture given to the house staff at 8:00 a.m. each Saturday morning. During this period, each student is required to write a thesis based on a clinical subject. Full time for nine weeks. Limited to two students each nine week period. *Dr. Odom and Neurosurgical Staff*

Investigative Neurosurgery. In this course the student is assigned a project relating to the neurological sciences and is provided with the technical help, recording equipment, and experimental animals necessary for its completion. This course specifically will not make the student into just another laboratory assistant. Instead, each student plans and executes his own individual project, with the help of the neurosurgery staff. Laboratory space is available and clinical and experimental research projects in neurophysiology and cerebrovascular physiology are currently in progress. The student is expected to attend weekly conferences in neurology, neuroradiology, and neuropathology, and the weekly neurosurgery lecture given to the house staff at 8:00 a.m. each Saturday morning. Course is full time for a given period. To be offered three times a year for eighteen weeks. Limited to two students each eighteen week period. *Dr. Odom and Neurosurgical Staff*

General Otolaryngology. This is a clinical Otolaryngology course. The students participate in the outpatient clinic activities and in the management of patients in the hospital. They are expected to participate in the work-up and management of patients admitted to the Otolaryngology Service and to assist in the operating room. Participation in the Otology Program acquaints the student with audiometric techniques. Diagnosis and management of head and neck cancer will be covered, and the student will attend the Head and Neck Cancer Clinic in the Division of Radiation Therapy. Each student will be required to submit a paper dealing with some aspect of Otolaryngology. This course would be especially valuable to those interested in Neurosurgery, Ophthalmology, Neurology, or Pediatrics. Full time for nine weeks. To be given every nine week period. Limited to one or two students. *Drs. Greenwood, Kenan, and Hudson*

Medical Audiology and Speech Pathology. Students will primarily be

working in the Hearing and Speech Clinic. Special attention will be given to advanced audiometric techniques including instruction in the use of the Bekesey and PGSR audiometry. Emphasis will also be placed on vestibular mechanisms and testing. The student will also spend some time with the speech pathologist observing methods diagnosis and management of the various speech problems. Contact with clinical Otolaryngology will be maintained. Four hours, five times a week for nine weeks. Given every nine week period. Limited to one or two students. *Mr. King and Dr. Massengill*

Otophysiology Lecture Series. This course is didactic and will be offered to the residents as well as to students. Lectures on auditory and vestibular physiology will be given. The Department of Psychology will participate in this lecture series particularly emphasizing psychoacoustics and conditioned responses. In all probability this course will be given in the evenings. It will be primarily aimed toward Otolaryngology residents and graduate students in Psychology but any number of interested medical students will be accepted. One hour weekly for eighteen weeks. Given once yearly. No limit to number of students. *Drs. Greenwood, Diamond, and Hudson*

Otolaryngology Lecture Series. In this one or two hour a week lecture series, general Otolaryngology will be covered with the emphasis on clinical aspects. This will be entirely a didactic lecture course, and at the conclusion an examination will be given. This lecture course will be essentially the same course as offered now to senior students. One hour per week for eighteen weeks. To be given two times yearly. No limit to number of students. *Drs. Hudson and Kenan*

Reconstructive Plastic Surgery. This course will give the interested student a concentrated course in reconstructive surgery—(the equivalent of an intern) operating, emergency, and dressing rooms and clinics—private and public ward assignments, lectures, and demonstrations. This course would include patients with the following conditions: congenital malformations of the face, hands, and rectogenital systems; acute facial and peripheral trauma; burns; paraplegics; esthetic surgery; cancer of the face, oral cavity, and neck, and reconstructive surgery following trauma and disease. One student can be accommodated on a full time basis for each nine weeks. *Drs. Pickrell, Georgiade, and Plastic Surgery Staff*

Physiology and Bacteriology of Healing Wounds. This course is designed for the student who is interested in the physiology and bacteriology of healing wounds. The student is assigned to the dressing rooms daily, Monday through Friday, where he has an abundant opportunity to study the bacteriology and physiology of healing wounds, acute trauma, following excisional surgery, and following many types of grafting and reconstructive procedures. The effects of various antiseptics and local applications of emollients could be studied in conjunction with their possible bacteriocidal or bacteriostatic effects. Four hours (8:00 a.m.

to 12 noon) five times a week for nine weeks. Limited to one student for each nine weeks. *Drs. Pickrell, Georgiade, and Plastic Surgery Staff*

Speech and Hearing Problems in Children with Clefts of the Lip and Palate. The student who is interested in speech and hearing problems in children, especially as they relate to children with clefts of the lip and palate, is given an abundant opportunity to learn and work in the Speech and Hearing Laboratories and the Child Guidance Clinic. Methods of evaluation, testing, and remedial measures will be studied thoroughly. Three hours (2:00 p.m. to 5:00 p.m.), five times a week for nine weeks. Limited to one student. *Dr. Massengill (Speech); Dr. Hudson and Mr. King (Audiology); Drs. Quinn and Wentz (Orthodontics); Drs. Pickrell, Georgiade, and Staff (Plastic and Reconstructive surgery)*

Anesthesiology—Applied Physiology and Pharmacology. This course will allow application of the principles of respiratory and cardiovascular physiology to therapeutic practice in patients. By means of lecture-demonstrations, followed by direct participation, students will evaluate and discuss: (1) physiologic techniques of ventilation, (2) the efficacy of various mechanical ventilators, (3) the value of respiratory resuscitation, (4) the importance of cardiac resuscitation, (5) the significance of therapeutic and diagnostic nerve blocks, (6) the actions of anesthetic drugs, (7) the effects of vasopressor and cardiac stimulant drugs, and (8) the action of analeptic drugs. Three hours, five times a week for nine weeks. To be given twice a year. Limited to ten students. *Entire Anesthesia Staff*

Anesthesiology—Principles and Practice. This course is an introduction to the role of the anesthesiologist in the care of hospitalized patients. It includes: (1) six weeks of active administration of clinical anesthesia under direct, close supervision, with the student actively evaluating the responsibilities of the anesthesiologist and familiarizing himself with the techniques and drugs employed, (2) one week in the recovery room and exposure to obstetric anesthesia, observing, diagnosing, and treating immediate postoperative complications, and participating in methods of pain relief for obstetric delivery, (3) one week in Inhalation Therapy Division evaluating the practical aspects of oxygen administration, and utilization of mechanical ventilators for acute and chronic therapy, (4) one week in Anesthesia Laboratory practicing techniques of monitoring vital signs (blood pressure, venous pressure, respiration, electrocardiogram, electroencephalogram, and means of determining pH, pCO₂, and pO₂ of blood and respired gases), utilizing such modern techniques as infrared analyzers, chromatography, and specific electrodes. Experiments will illustrate resuscitative techniques and hazards of certain drug combinations. Full time for nine weeks. To be given each quarter. Limited to eight students. *Entire Anesthesia Staff*

Anesthesiology Research. This course teaches techniques utilized in clinical and laboratory research in anesthesiology. In collaboration with

the faculty, the student will work on a research project related to the physiology of pharmacology of anesthetic practice. A wide range of facilities is available for the measurement of respiratory and circulatory parameters, both in animals and in man. Full time for nine weeks. To be given each quarter. Limited to two students. *Drs. Hall and Stephen*

Medical Speech Pathology. This course will emphasize diagnostic and rehabilitation treatment used with the patients who will be seen in the Medical Center. The following conditions will be reviewed: articulation disorders, delayed speech development, cleft palate, stuttering, voice disorders, aphasia, cerebral palsy, language disorders, mental retarded speech, lisping, oral inaccuracy, laryngectomy, and other disorders of speech not falling under one certain category. The role the physician plays in the total rehabilitation of the speech-impaired patient will be stressed. Three hours, four times a week, for nine weeks. All quarters. *Dr. Massengill*

Research in Medical Speech Pathology as Applied to Reconstructive Plastic Surgery. This course is designed to present a composite analysis of research techniques used by the speech pathologist with reconstructive plastic surgery patients who possess organic speech problems. Certain emphasis will be placed on cinefluorographic investigation and speech results achieved by different surgical procedures. The use of different speech appliances will also be reviewed. The course will deal with the organization and administrations of speech pathology research programs coordinated with reconstructive surgery departments. Three hours, four times a week, for nine weeks. All Quarters. *Dr. Massengill*

General Orthopaedics. This course is a comprehensive introduction to Orthopaedic Surgery designed primarily to broaden the student's understanding of the specialty. It consists of full or part-time experience in the Orthopaedic service, daily contact with the staff and house officers, and duties similar to those of the junior intern including care of inpatients, outpatient experience, and work in the operating room. The student attends all conferences and rounds, has an opportunity to visit with staff members at the State Crippled Children Clinics in various areas of North Carolina, and to observe the participation of the State and local Health and Welfare Departments and Vocational Rehabilitation Counselors in a well-established rehabilitation program with close personal contact of those participating with each agent fully familiar with the problems. The overall purpose of the course is to develop a broad concept of Orthopaedics, particularly for those students planning a career in general practice or Pediatrics, to teach practical techniques to those students interested in allied surgical specialties, and to give those students interested in Orthopaedics as a specialty an opportunity to evaluate all phases of such a career. Time flexible, part or full time, for nine weeks. Limited to four students. *Orthopaedic Staff*

Office Orthopaedics. An introduction to outpatient Orthopaedic prob-

lems, patient examination, disability evaluation, the management of compensation-liability problems, and establishment of medico-legal contact with emphasis on record-keeping and office management. Half time, five afternoons per week. Limited to four students. *Associated Staff in practice in Durham and Duke Staff*

Orthopaedics in the Community Hospital. This course is similar to those mentioned earlier, with more emphasis on the private practice of Orthopaedics, especially as an office consultation service in a community including the coordinating of office practice, emergency room, and hospital services. This course is conducted in the offices of the Associate Orthopaedists in Durham and at Watts and Lincoln Hospitals. Time flexible, for nine weeks. Limited to four students. *Drs. Bugg, Glasson, Coonrad, and Kapoor*

Cerebral Palsy. Opportunities are available in this field both for clinical experience and laboratory investigation in cerebral palsy and general children's Orthopaedics. The course is given at the North Carolina Cerebral Palsy Hospital and the Duke University Medical Center. Students participate in rehabilitation and occupational therapy and diagnostic conferences and rounds, with opportunity to observe psychological evaluation of the handicapped and the handling of family problems. In addition, the student observes and assists in the surgical care, bracing, and rehabilitation of these patients. Time flexible, part or full-time, for nine weeks.

Adequate Fellowships with full support are available through the United Cerebral Palsy Foundation both for clinical work and investigation. Time, nine weeks, full time.

Clinical Conferences in Cerebral Palsy. These conferences are arranged for the benefit of students primarily interested in neurological diseases, Pediatrics, and related fields. This part-time opportunity is available throughout the year, 11:00 a.m. to 12:00 noon on Mondays and 10:00 a.m. to 12:00 noon on Wednesdays at the North Carolina Cerebral Palsy Hospital. *Drs. Baker, Bassett, and N. C. C. P. H. Staff*

Surgery of the Hand. This course is a part-time clinical experience emphasizing didactic and functional anatomy of the hand, evaluation of the injured upper extremity, and reconstructive hand surgery. Opportunity to carry out investigation, particularly clinical surveys, is available if desired. Schedule is flexible. The course is limited to two students. For nine to eighteen weeks. *Dr. Goldner*

Orthopaedic Aspects of Arthritis. A clinical experience in adult and children's rheumatology in conjunction with the Department of Medicine. The student attends rheumatology conferences, rounds, and clinic. Opportunity is available for investigative work through the rheumatology program. (See Rheumatology under Medicine.) Surgical experience can be arranged through Dr. McCollum. Time can be arranged according to the student's interests and desires. *Dr. McCollum and Medical Rheumatology Staff*

Athletic Medicine. The course stresses the importance of the care of playground, high school, and college athletic injuries. The course content, although dealing with Orthopaedic and traumatic problems, is directed at preparing doctors who plan to practice general medicine or surgery and think they would enjoy participating in their community's school programs. In addition to the specific orthopaedic and traumatic therapy, lectures and experience in conditioning dieting, protective equipment, and prevention and care of athletic injuries, will be included. Practical experience will be available in the training rooms of the Duke University Department of Athletics and on the athletic fields at the University and the local high schools. Limited to two students, half-time. Given during the first and second quarters for nine weeks. Approximately three afternoons a week, plus Friday evenings and Saturday afternoons. *Drs. Baker, Clippinger, Bassett, and the Physical Education Staff*

Electromyography. This course is an introduction to electrodiagnostic techniques and theories and practice of clinical electromyography. It consists of lectures and patient and laboratory demonstrations. Individual projects directed at the study of specific diseases of the neuromuscular system may be arranged. The course is given each term for nine weeks. Limited to four students for one hour per week. Additional time can be arranged for special projects. *Dr. Clippinger*

Research in Orthopaedics. This course gives the student an opportunity to spend part or full time in laboratory investigation or clinical research in Orthopaedics and related fields. In the main it will consist of individual projects with experience in investigations currently in progress in Orthopaedics at the Medical Center, Veterans Administration Hospital, and the North Carolina Cerebral Palsy Hospital. Hours and length of study, of necessity, are flexible and vary from time to time and according to available projects and the student's interest and desire. *Orthopaedic Staff*

Rehabilitation of the Amputee. In this course the student's training is directed at developing a full knowledge of the basic principles of amputation, postoperative care, and psychological adjustment, through weekly Amputee Clinics at the Duke University Medical Center, the Durham Veterans Administration Hospital, and the Veterans Administration Regional Office in Winston-Salem. Special training is offered in the mechanics of prosthetics, their manufacturing, and instruction in prescription, fitting, and theories of their use. The experience is offered in the Orthotics and Prosthetic Shop, Physical and Occupational Therapy, Rehabilitation, and Vocational Placement. Three half-days per week for nine to eighteen weeks. Limited to four students. *Drs. Goldner and Clippinger, Mr. Titus, Miss Kaiser, and the Duke Prosthetic Shop and Physical Therapy Staffs*

Introduction to Fractures. This course offers the student an opportunity to participate in the emergency and follow-up care of fractures at the Duke Medical Center and Watts and Lincoln Hospitals, where, by special

arrangement, he may be on emergency call. In addition, he attends and participates in Fracture and Plaster Clinics and ward rounds, at the Medical Center on Friday mornings and at Watts Hospital on Saturday mornings. Extent of participation by special arrangement. Time is flexible. Limited to four students. *Medical Center and Watts Orthopaedic Staffs*

Children's Orthopaedics. This course is directed primarily at acquainting students interested in Orthopaedics or Pediatrics in the basic problems associated with congenital abnormalities and other Orthopaedic problems of childhood. In addition to the experience available at the North Carolina Cerebral Palsy Hospital and Duke University Medical Center, student internships are available at the North Carolina Orthopaedic Hospital and at the Shriners' Hospital for Crippled Children. For those students particularly interested in children's Orthopaedics, the internships are available for 9, 18, or 36 weeks on a full-time basis with opportunity to participate in all the activities at the hospitals. The student internships are particularly recommended for those interested in Pediatrics.

In addition, by special arrangement, one student at a time may attend any or all of the following Crippled Children's Clinics sponsored each month by the Crippled Children's Division of the North Carolina State Board of Health as follows:

1st Thursday—Roanoke Rapids—*Drs. Bugg and Coonrad*

1st Friday—Lumberton, followed by visit to McCain Hospital—*Drs. Goldner and Clippinger*

2nd Friday and the Saturday following the 2nd Friday—Clinton and Morehead City respectively—*Drs. Baker and Bassett*

3rd Thursday—Goldsboro—*Dr. Roberts of the North Carolina Orthopaedic Hospital and Drs. Goldner and McCollum*

3rd Thursday—Halifax—*Drs. Bugg and Coonrad*

Friday following 3rd Thursday—Ahoskie—*Drs. Baker and McCollum*

Last Friday—Wilson—*Drs. Baker and Bassett*

By special arrangement, more than one student may attend any or all of the above Clinics.

Undergraduate Cancer Training Program

(Supported by a grant-in-aid from the USPHS)

Professor W. Shingleton, *Chairman*; Associate Professor A. G. Smith, *Coordinator*

The Undergraduate Cancer Training Program is designed to improve the teaching of cancer to undergraduate medical students. Special teach-

ing and demonstration on tumors is started during the student's course in Pathology and is continued into the clinical years. All clinical departments provide clinics, conferences, and seminars which are designed to provide in depth an understanding of the nature, diagnosis, natural history, and treatment of malignant tumors. In addition, special seminars with outstanding cancer authorities from other institutions in the country are arranged annually. Selected staff members in the various clinical departments are involved in teaching this program, which is continuous throughout the medical school year.

The student is instructed in cancer problems by ward assignments, tumor clinics for the undergraduate student, and special lectures and courses given by various departments. During the third year, the student studies ward patients with a clinical instructor from the Departments of Surgery, Obstetrics and Gynecology, or Pediatrics. The student participates in all phases of the care of patients with cancer (diagnosis, pre- and post-operative care, and assisting in the operation). He observes the lesion in situ, examines it in the fresh state, follows the specimen through the pathologic laboratory, and studies the prepared slides for microscopic appearance, thereby learning pathology techniques and checking on the accuracy of his own diagnosis. Interdepartmental tumor clinics offer combined teaching by the pathologist, radiologist, surgeon, gynecologist, and pediatrician, and teach the student the techniques and value of each of these disciplines, as well as giving the student a comprehensive review of the special cancer problems. Special courses given by the Departments of Radiology and Pathology teach the use and value of diagnostic and therapeutic x-ray and diagnostic surgical pathology in handling the cancer patient.

The training program is supplemented by a tumor registry where accurate follow-up records are kept with the results summarized and made available to staff and students. Thus they can know the year by year results of treatment of large numbers of patients as expressed in percentages of those (1) free of recurrence, (2) apparently cured, (3) having a recurrence, or (4) dead of recurrence at varying times after onset of the disease and the institution of therapy.

Veterinary Medicine

Assistant Professor J. Lemay, *Chairman*; Associates N. Sojka, B. Sherwood; Assistant R. Castellanos

The function of this Department is to facilitate the various teaching and research programs that require laboratory animals. Veterinary medical consultation is provided for research projects in which experiments are conducted on animals. Assistance is made available in selecting the most



suitable species or strain of laboratory animal to use in a given study. In addition, animals are procured, quarantined, and appropriately conditioned in order to provide a highly reliable biological tool. A wide variety of technical services are carried on, such as providing whole blood of a variety of species, collecting biological specimens, providing clinical pathologic examinations, preparing animals for surgery, postsurgical care, and maintenance of the animal colonies.

The Department collaborates with those departments of the School of Medicine that utilize laboratory animals in their teaching programs. Various disease states are experimentally produced in animals for student observation and study, and techniques for collecting biological specimens for additional study are demonstrated. Aid is given in setting up and carrying out these demonstrations and studies on animals.

A postdoctoral training program in laboratory animal medicine has been initiated and plans are under way to increase the number of available training positions.

Although the Department is in an early stage of development, research is under way on some of the spontaneous diseases of laboratory animals.

Health Related Professions

Cytotechnology

Professor N. Kaufman, *Director*; Associate M. Vazquez, *Assistant Director*; and Staff of Department of Pathology as required in special phases of instruction.

The School of Cytotechnology at the Department of Pathology offers a twelve-month course in technical and diagnostic aspects of exfoliative cytology to qualified individuals. The minimum qualifications are twelve semester hours of Biology, which may include Anatomy, Histology, Zoology, Botany, and Physiology, and at least two years of college. The common practice is to admit individuals with B.S. or A.B. degrees and only in exceptional cases applicants with incomplete college requirements will be considered.

The program consists of two parts. Part I—six months, primarily theoretical and practical exercise in the techniques of exfoliative cytology and interpretation of the clinical material. Part II—six months practical training in all aspects of exfoliative cytology in participating in the routine work of the laboratory. One class is accepted annually on January 1. Graduates of this course are awarded a certificate and are eligible to take the certifying examinations given by the Registry of Medical Technologists of the American Society of Clinical Pathologists. There is no tuition fee. Additional information about the School of Cytotechnology and ap-

plications for admission may be obtained from Nathan Kaufman, M.D., Department of Pathology, Duke University Medical Center, Durham, North Carolina.

Dietetics

Director D. Tate; Educational Director M. McLachlan; Assistant Director M. Pate; Administrative Dietitians V. Murphy, N. Curtis; Therapeutic Dietitians C. Conely, H. Ferguson, J. Burleigh, R. Stoner, C. Rusian, J. Hunter; Clinic Dietitian C. Wason; Research Dietitian V. Irons; Special Projects Dietitian M. Olive; Teaching Dietitian P. Jennings

A Dietetic Internship Program is offered to men and women who have graduated from college in Food and Nutrition or Institutional Administration and meet the course requirements of the American Dietetic Association. The twelve months of post-baccalaureate work consists of classroom instruction and clinical experience in administration, therapeutics, research, and education. After the successful completion of the Dietetic Internship, certificates and membership into the American Dietetic Association are awarded. For further information write:

Department of Dietetics
Duke University Medical Center
Durham, North Carolina

Hospital Administration

Professor R. Brown, *Director*; Assistant Professor D. S. Smith, *Coordinator*; Professor C. Frenzel; Associate Professor L. Swanson; Clinical Associate M. Pickens

Clinical Lecturer E. C. Bryson; *Instructors* C. Boone, R. Jennings, R. Bindewald, C. Cobb; *Clinical Instructors* J. Felts, G. Harris, H. Rowland, B. McCall; *Clinical Preceptors* W. Andrews, J. Barnes, H. Bettis, J. Moulton, J. Pyne, M. Yount

Graduate education for hospital administration is offered through a 24-month program conducted jointly by the Graduate School of Arts and Sciences and the Medical Center. The Program consists of selected graduate courses in Economics, Political Science, Sociology, and Hospital Administration, and of a twelve-month administrative residency in hos-

pitals and other health agencies. The Master of Hospital Administration degree is awarded to those who successfully complete the Program.

Detailed information may be obtained from:

Graduate Program in Hospital Administration
Box 3018
Duke University Medical Center
Durham, North Carolina

Medical Art and Illustration

Professor E. Clark, *Director*; Associates R. Blake, H. Pickett; Instructors R. Howard, L. Hart

The primary function of this division comprised of artists and photographers is to produce a wide variety of visual aids for members of the Medical Center staff. Due to the ever-increasing need within the University, and as no similar service is available, this Division also offers its services to the University faculty as a whole. The illustrations produced through art and photography are used for teaching aids (including exhibits), illustrating papers or books for publication, recording research data, and enhancing hospital and administrative records. Services offered by this Division are: (1) Medical Art Section—Illustrations produced by various art methods and techniques, of subjects seen or unseen, and even the theoretical, limited only by the available equipment and talents of the artists. Services rendered are schematic and mechanical drawings, diagrams, charts, graphs, designs, lettering, signs, casts, models and exhibits, and many other forms of illustrations normally ascribed to an artist. (2) Medical Photography Section—photographic illustrations through various photographic methods and techniques limited only by the available photographic equipment and the talents of the photographers. Services rendered are still and motion pictures, pictures of the retinae, photographic copies, transparencies, film strips, lantern slides, enlargements, and contact prints, Medical Center staff and student pictures for administrative records, and many other forms of illustrations normally ascribed to a photographer.

Under the direction of this division, services offered directly to the patient are: production of facial prostheses used to replace missing anatomical parts and instruction in the use of opaque cosmetics used to cover skin discolorations.

Facilities for individual instruction in, or demonstration of, specific techniques and methods employed by this division, as well as instruction in the proper use of standard projection equipment are available to students and faculty of the University. No academic credit is given. Pre-

requisites, fees, time, and type of instruction will be determined by the Chairman of this Division. Duke University does not have a school of medical art or medical photography, and this division does not offer any formal courses in these fields of endeavor.

Medical Technology

Professor T. Kinney, *Director*; B. Ashbrook, *Registrar and Associate*; Professor R. Thiers; Associate Professor S. Osterhout; Assistant Professors A. Muser, F. Pircher, H. Silberman, G. Spooner

Instructors P. Smith, C. Harrison, C. Oglesby, S. Schrack, M. Garriss, A. Proctor, N. Lester, M. Beck, J. Carr, M. Harris, J. Pickett

The School of Medical Technology offers a twelve-month internship program of instruction and rotation through the clinical laboratories of the Duke University Medical Center and the Veterans Administration Hospital.

The internship program is open to men and women who have either a baccalaureate degree or a minimum of three years of college (in an accredited college or university) with plans for receiving such a degree from the preparatory college upon completion of the internship program. Applicants must have successfully completed at least 90 semester (135 quarters) hours which include:

Chemistry—minimum of 16 semester hours (24 quarter hours) which includes one full year of general college Chemistry. The remaining courses may be selected from qualitative, quantitative, organic, physical, or biochemistry. (One semester of quantitative analysis is strongly recommended.) All courses must include lectures and laboratories.

Biological Sciences—minimum of 16 semester hours (24 quarter hours). All required biological sciences must include lecture and laboratories. Courses may be selected from general Biology, Zoology, Botany, Physiology, Comparative Anatomy, Parasitology, Histology, Histologic Technique, Genetics, or Bacteriology. (Bacteriology is strongly recommended.)

Mathematics—minimum of 3 semester hours.

Courses in Physics are recommended but not required. Electives may be selected from English, social sciences, arts, and Humanities.

Courses taught during the Internship include Clinical Biochemistry, Clinical Microscopy, Radioisotope Theory, Microbiology (Bacteriology, Mycology, Virology), Immunoematology, Parasitology, Introduction to Clinical Pathology, Serologic Techniques and Histologic Techniques. (Classes begin on July 1.)

Students are given a certificate upon completion of the Internship

program and are qualified for examination and certification by the Registry of Medical Technologists of the American Society of Clinical Pathologists. They are eligible for membership in the American Society of Medical Technologists. This program is approved by the Council on Medical Education and Hospitals of the American Medical Association.

A \$25.00 non-refundable registration fee is required upon acceptance in the program. This is applied towards the \$50.00 breakage fee which is payable upon entrance. Students will be furnished rooms in dormitories and will receive a grant-in-aid of \$100 a month. Students are required to participate in the Hospital Insurance plan, furnish their own white uniforms, white shoes, and meals. Laundry of uniforms is furnished by the Medical Center. Students can expect to spend \$50 to \$75 for books during the year.

For further information and/or application blanks, write to: Registrar, School of Medical Technology, Department of Pathology, Duke University Medical Center, Durham, North Carolina 27706

Nurse Anesthesia

Professor C. Stephen, *Chief of Division of Anesthesiology*; Instructor M. Campbell, *Chief Nurse Anesthetist*; M. Gardner, *Educational Program Director*; Assistant Nurse Anesthetists L. Glenn, F. Perry, A. Truitt, M. Haigler, M. Bennett, A. Moody

The twenty-four month course in anesthesia is available to well qualified registered nurses. Instruction embraces the theoretical aspects and clinical application of all drugs and techniques in accepted usage. The program is divided into quarters. The major part of the basic theoretical instruction is given during the first three quarters. After a pre-clinical period of eight weeks, clinical practice runs parallel with the theoretical program. One class is accepted annually and enrolled in January. All appointments of the current year are made by September 1 of the preceding year. Graduates of this course are eligible to take the qualifying examination for membership in the American Association of Nurse Anesthetists. Tuition is \$150.00. Additional information concerning nurse anesthesia may be obtained from Mary B. Campbell, C.R.N.A., P.O. Box 3204, Duke University Medical Center, Durham, North Carolina.

Physical Therapy

Associate Professor H. Kaiser, *Director*; Associate G. Horton, *Supervisor of Treatment Division*; I. Parrish, *Coordinator for Extension Services*;

A. McCallum, *Secretary-Recorder*; B. Baker, *Assistant Supervisor*; Assistant Professor E. Flanagan; Associates E. Blumenthal, J. Riebel; *Instructors* E. Villanueva, K. LeGuin, J. Cantey, S. Espenshade; Assistants G. Hart, J. Hampton, C. Palmer, P. Allen, W. Schmidt, J. Rae, J. Griffin, W. Swann, G. Hutcheson, M. Clendenin; Visiting Trainee M. DeLorme

The curriculum in Physical Therapy is conducted under the joint auspices of the Graduate School of Arts and Sciences and the Medical Center.

Two programs are offered. One leads to a Certificate in Physical Therapy and a Master of Arts degree and the other to a certificate. Graduates of either program are eligible for state and national licensing and registration examinations and membership in the American Physical Therapy Association.

Prerequisites for both programs are basic courses in Psychology, Mathematics through Trigonometry, and one year laboratory course in Chemistry, a biological science exclusive of Botany, and Physics covering the principles of heat, mechanics, and electricity and satisfactory scores on the Graduate Record Examination. Those wishing to enter the program leading to a Master of Arts degree must also meet the requirements of their selected major as well as have successfully completed a course in Calculus and additional Chemistry courses. Those seeking admission to the program leading to a Certificate in Physical Therapy must have completed a baccalaureate degree or plan to receive such a degree from the preparatory college upon completion of the physical therapy program.

The program leading to a Certificate in Physical Therapy and a Master of Arts degree is a two year program. In the first year the necessary credit courses may be selected from the following: Anatomy M201, 6 units; M202, 3 units; M203, 4 units; M205, 2 units; M313-314, 2 units; Physiology M261-262, 8 units; M279, 1 unit; M370, 2 units; M372, 3 units; Psychology S232, 3 units; Biochemistry 201, 6 units; Zoology 252, 4 units; 245, 3 or 4 units; 271, 4 units. In the second year, in addition to the thesis, the physical therapy procedure courses listed in the Certificate Program and practicum may be completed. Upon completion of the two year program, a Certificate in Physical Therapy and a Master of Arts degree are awarded.

The program leading to a Certificate in Physical Therapy may be completed in fifteen months. The curriculum includes: basic science courses, kinesiology, Pathology, Physical Therapy, and rehabilitation as related to the medical and surgical specialties, administration, ethics, physical therapy procedure courses, and sixteen weeks of clinical experience at the Duke University Medical Center, affiliated hospitals and state and county public health departments.

Tuition and health fees for the program leading to a Certificate in

Physical Therapy and a Master of Arts degree is approximately \$1,800. The total cost for the program leading to a Certificate in Physical Therapy is approximately \$1,200. Scholarship and loan funds are available.

For further information, write to the Director of Physical Therapy, Box 3247, Duke University Medical Center, Durham, North Carolina, 27706.

Nuclear Medicine

Professor R. Lester, *Chairman of the Department of Radiology*; Associate Professor J. Goodrich, *Director of Nuclear Medicine Division*; Professors R. Reeves, G. Baylin; Associate Professor P. Cavanaugh; Assistant Professors F. Pircher, A. McCrea

Instructor K. Sharpe; Radiological Safety Officer C. Knight

The Division of Nuclear Medicine offers three-month and twelve-month programs of instruction and laboratory training for clinical radioisotope technologists. This training includes experience by rotation through the Radiation Safety Office and the following Divisions of the Department of Radiology: Nuclear Medicine, Radiation Therapy, and Radiobiology.

An applicant for admission must be a graduate of an approved high school and registered by the American Society of Radiologic Technologists or the Registry of Medical Technologists (ASCP). Applicants having equivalent training and experience will be considered on an individual basis. A registration fee of \$100 is required, upon entrance, and is payable to the Treasurer, Duke University, on the day of entrance. Books and supplies are about \$25.00. No living quarters are provided for paramedical students by the University. Students live in town at their own expense. Completion of the one year program qualifies the participant for examination leading to the registry of American Society of Radiologic Technologists. Participants in the three-month course may qualify for this registry by pursuing on-the-job isotope technology in any institution having a clinical radioisotope laboratory. For further information address inquiries to:

Mrs. Kathryn Sharpe, Instructor in Radiology
(Division of Nuclear Medicine)
Box 3166 Duke University Medical Center
Durham, North Carolina 27706

Radiologic Technology

Professor R. Lester, *Chairman of the Department of Radiology*; Assistant Professor J. Cahoon, *Director of the School of Radiologic Technology*;

Professors R. Reeves, G. Baylin; Associate Professors W. Barry, B. Worde, J. Goree; Assistant Professors M. Capp, M. Raben, P. Cavanaugh, A. McCrea

Instructor B. Rackley; *Technical Instructors* M. Lockhart, E. Porter, G. Cheshire, R. Bone, J. Hough, V. Moody, M. Ahbe; *Radiological Safety Officer* C. Knight

The School of Radiologic Technology offers a two year training program of instruction and practical training in the Department of Radiology.

Students are admitted on September 1 of each year for two years of intensive training in the academic and practical aspects of Radiologic Technology.

During the second year the students are paid a stipend of \$100.00 per month. Upon completion of the course, the students are required to take the National Board Examinations in Radiologic Technology sponsored by the American Registry of Radiologic Technologists before a diploma is awarded. The school is approved by the Council on Education of the American Medical Association, the American College of Radiology, the American Registry of Radiologic Technologists, and the American Society of Radiologic Technologists.

Candidates for admission must be graduates of approved high schools and rank in the *upper third* of their class. Candidates with college credits are given preference. Official transcripts of high school and/or college grades, a list of three references, and a recent photograph must be included with the application before being considered by the Committee on Admissions. It is recommended that applicants be at least 19 years and not more than 30 years of age at the time of enrollment.

A tuition of \$100.00 payable to the Treasurer of Duke University is required on the day of admission. This is reimbursed during the second year in the form of a stipend. Books, supplies, and uniforms run about \$175.00. Laundry of uniforms is furnished by the Medical Center.

At the end of six months, if the student's work has been unsatisfactory or shows inaptitude for technical work in radiologic technology, he is advised to withdraw from the course.

No living quarters are provided for paramedical students by the University and the students in Radiologic Technology live in town at their own expense. For further information or application blanks, write to John B. Cahoon, R. T. Director, School of Radiologic Technology, Duke University Medical Center, Durham, North Carolina.

Prosthetic and Orthopaedic Appliances

Assistant Professor B. Titus, *Director*; Assistant Prosthetist and Orthotist R. Gooch; Assistant Orthotist P. Ray



The function of this Department is to produce prosthesis and orthopaedic appliances for the medical profession. Facilities for individual training in specific techniques or methods employed by this Department are available. Those who complete four years' training are eligible to take the examination of American Board of Certification.

The School of Nursing



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General Information

Philosophy and Purpose of the School of Nursing

The School of Nursing functions within the philosophy of Duke University. This philosophy is epitomized by its motto, *Eruditio et Religio*, which "reflects a fundamental faith in the union of knowledge and religion, the advancement of learning, the defense of scholarship, the love of freedom and truth, a spirit of tolerance, and a rendering of the greatest service to the individual, the state, the nation and the church. Through changing generations of students, the objective has been to encourage each individual to achieve to the extent of his capacities an understanding and appreciation of the world in which he lives, his relationship to it, his opportunities, and his responsibilities."

The faculty of the School of Nursing ascribes to the concept that a professional nurse is a person who has acquired the specialized knowledge of Nursing, who has attained abilities useful in practice of Nursing, and who has developed attitudes appropriate to the profession of Nursing.

The faculty conceives professional nursing to be a service which contributes to the health and well being of people. Professional nursing practice is dealing with human beings under stress, frequently over long periods of time; providing comfort and support in times of pain, anxiety, loneliness, and helplessness; perceiving, evaluating, and intervening appropriately; administering medications and treatments; using clinical nursing judgment in establishing, maintaining, and/or modifying a plan of

care; and knowing when and how to use existing and potential resources to help patients toward recovery and adjustment. Professional nursing practice is sharing responsibility for the health and welfare of all those in the community; participating in programs designed to prevent illness and maintain health; coordinating professional and technical services in the best interest of patient care; and supervising, teaching, and directing all those who give nursing care. Professional nursing practice requires constant evaluation; asks questions and seeks answers which will add to the body of nursing theories; and transmits and uses the theories, as well as other research findings, to improve services to patients and service programs to people. Professional nursing practice requires knowledge and skill of high order and provides opportunities for personal and professional fulfillment.

The faculty believes that the primary aim of nursing education is to provide an environment in which the student can develop self-discipline, intellectual curiosity, the ability to think critically, and acquire the knowledge necessary for practice. The faculty believes that learning is manifested by change of behavior, resulting from experience; that an atmosphere for learning is one in which systematic direction and guidance of the learner is offered in a climate which encourages self-direction and creativity; that professional nurse education implies that the student who seeks admission to the school comes with the intent of practicing professional nursing; and, that the curriculum offered aids the student in realizing this intent and in stimulating the desire for continued professional growth.

The School of Nursing is committed to promoting human health and welfare through providing foundations for knowledgeable nursing services and is committed to contributing to the attainment of the University's aims of teaching, research, and public service.

The school aims to prepare its graduates to function as practitioners of professional nursing in roles most appropriate to the level of their preparation, as beginning professional practitioners, as leaders of nursing teams, as health teachers or counselors, and as colleagues with other professionals who contribute to the health and well-being of people. The school aims to provide its students with an educational background which will serve as a basis for advanced study in nursing, and for continued personal and professional growth.

History

The School of Nursing of Duke University was established in association with the School of Medicine and Duke Hospital. The first class of students was admitted in January, 1931. In 1953, the School of Nursing

was incorporated into the Division of Health Affairs in the University structure. When established, the three-year curriculum leading to the Diploma in Nursing was planned to prepare young women to meet community nursing needs; students who completed two years of acceptable college work were awarded a Bachelor of Science degree in Nursing in addition to the Diploma in Nursing. Trends in nursing created a demand for a four-year program leading to the degree of Bachelor of Science in Nursing, and in 1953, the University Board of Trustees approved such a program. The Master of Science in Nursing Degree was authorized in 1956.

Graduates of Duke University School of Nursing have served their communities in North Carolina and in other states; they have participated in their professional organizations on a national, state, and local level. During World War II, graduates of this school staffed the 65th General Hospital of the Duke University Medical Unit.

Relationship to the University

As a part of the University community, the School of Nursing serves its students as the focus of a total educational experience that only a major university can provide. It shares the same campus with Trinity College, College of Engineering, the Graduate School of Arts and Sciences, the Divinity School, and the Schools of Law, Medicine, and Forestry, and Duke Medical Center. The facilities for library, laboratory, and field work, and the many activities—religious, intellectual, cultural, and athletic—form part of the environment which contributes to the development of students in nursing. Thus, the student in nursing may enjoy simultaneously the broad facilities and challenges of a University and the life and atmosphere of a professional school.

Membership and Accreditation

Duke University, which incorporates the School of Nursing with all of the other schools of the University, is a member of the Association of American Colleges and is accredited by the Southern Association of Colleges and Secondary Schools.

The generic program leading to the degree of Bachelor of Science in Nursing is accredited by the National League for Nursing and the North Carolina Board of Nursing.

The School is a member of the Department of Baccalaureate and Higher Degree Programs of the National League for Nursing.

Undergraduate Course of Study and Requirements for Degree

The Bachelor of Science in Nursing

The School of Nursing offers a program which is planned to cover a period of four years; four academic years and three summer terms. At the completion of this program, the student receives the degree of Bachelor of Science in Nursing and is then eligible for the examinations given by the North Carolina State Board of Nurse Examiners.

Undergraduate study in nursing offers an opportunity for high school graduates to earn the professional degree, Bachelor of Science in Nursing. The aim of the curriculum is (1) to provide students with information to better equip them to function as workers and as citizens; (2) to provide opportunities for gaining the basic knowledges, skills, and attitudes of the developing professional nurse; and (3) to provide the foundations for continuing learning and study.

Undergraduate study in nursing aims to develop a continual desire for knowledge through experiences planned for the development of desirable attitudes. These attitudes include a concern for personal enrichment and appreciation of, and the respect for, individuality and an awareness of the

nurse's role as a citizen in contributing to her own development and to that of her community and profession.

Like all education, undergraduate education in nursing can only initiate the process of growth that will ultimately result in intellectual maturity and social responsibility. Developing professional persons need to leave school with an awareness that they must continue to grow intellectually, that they must have foundations which distinguish them as individuals with open minds and a curiosity about life, and that they should be equipped to supplement their knowledge, skills, and attitudes as required in a changing world.

The purposes and objectives of the undergraduate program of study are compatible with the statement of characteristics of baccalaureate education in nursing developed by the National League for Nursing. The program aims toward the development of minds capable of meeting health needs of society through roles appropriate for a beginning practitioner of professional nursing.

Requirements for Degree

To fulfill the requirements for the degree of Bachelor of Science in Nursing, a student must complete the program with a C average, must complete 132 semester hours as outlined below, earn 264 quality points, and show proficiency in the practice of nursing.

The requirements for the degree of Bachelor of Science in Nursing are based on the principle that the student will derive the maximum benefit if the program includes a broad distribution of studies among representative fields.

For graduation with the degree of Bachelor of Science in Nursing, the following course work or equivalent must be completed.

These requirements are described in detail below.

<i>Uniform Course Requirements</i>	<i>s.h.</i>
English	6
Basic Science	8
Social Sciences	24
Elective (Religion, Art, Music, Philosophy or Literature)	12-15
Physical Education	2
Nursing Related Sciences	13-16
Nursing Major	64
<i>Total</i>	132

English. 6 s.h. This requirement is met by the completion of English 1-2.

Basic Science. 8 s.h. To satisfy this requirement, the student must com-

plete a one year laboratory course in one of the basic sciences: Biology, Chemistry, or Physics.

Social Sciences. 24 s.h. The following courses will satisfy this requirement: Psychology 91, Psychology 116, Sociology 91, and Sociology 150. Three of the remaining twelve hours must be selected from Sociology, three from Psychology and six hours from Political Science, Economics or History (students who do not present for entrance two acceptable units of History must select History).

Electives (Art, Music, Philosophy, Literature or Religion). 12-15 s.h. This requirement can be satisfied by a total of twelve semester hours in courses in English or American literature, Greek literature, foreign literature courses, literature courses in translation, courses in aesthetics, art, music, and courses in Religion and Philosophy (except 48, 103, 104, 109). The student who is not required to complete N50, is required to complete three additional hours of electives for a total of fifteen semester hours.

Physical Education. 2 s.h. Physical Education is required during the first year and should be completed by the end of the first year.

Nursing Related Sciences. 13-16 s.h. To satisfy this requirement, the student must complete the courses N4, N50-51, N52, N53. If a student has completed Chemistry 1-2, N50 will not be required.

Nursing Major. 64 s.h. This requirement is met by completing nursing courses in accordance with the regulations described elsewhere.

To complete the requirements in the regular period (four years), the work is planned as follows:

First Year

	<i>s.h.</i>
English 1-2	6
Social Science	6
(History, Political Science or Economics)	
Elective	6
(Art, Music, Philosophy, Literature or Religion)	
Nursing 1-2	4
Basic Science	8
(Biology, Physics, or Chemistry)	
Nursing 4 (Introduction to Microbiology)	3
Physical Education 1-2	2
<i>Total</i>	<u>35</u>

Summer Session

Nursing 50 (Introduction to Basic Chemistry)	3
or Elective (Religion, Philosophy or Literature)	
Psychology 91	3
<i>Total</i>	<u>6</u>

Second Year

s.h.

Nursing 51 (Introduction to Bio-Chemistry)	3
Nursing 52 (Introduction of Human Anatomy and Physiology)	4
Nursing 53 Normal and Therapeutic Nutrition	3
Nursing 91-92 Fundamentals of Nursing	12
Sociology 91 General Sociology	3
Elective (Sociology and Psychology)	6
Elective (Religion, Art, Music, Philosophy or Literature)	6
<i>Total</i>	37

Third Year

s.h.

Nursing 120	Pediatric Nursing	6
Nursing 130	Obstetric Nursing	6
Nursing 141	Medical-Surgical Nursing Theory	5
Nursing 142	Medical-Surgical Nursing Practicum	4
Nursing 155	Social Forces and Community Health	3
Sociology 150	The Family	3
Psychology 116	Psychology of Adjustment	3
Nursing 180	Public Health Sciences	3
<i>Total</i>		33

Fourth Year

s.h.

Nursing 160	Social Foundation of Nursing	3
Nursing 170	Psychiatric Nursing	6
Nursing 181	Public Health Nursing	6
Nursing 191	Nursing Team Leadership and Intensive Nursing Care	6
<i>Total</i>		21



Resources for Study

Instructional Facilities

The facilities for instruction include the facilities available in the undergraduate, professional, and graduate schools and colleges of Duke University and the clinical facilities of Duke Hospital, the North Carolina Cerebral Palsy Hospital, the Veteran's Administration Hospital, and the Durham Health Department.

In a wing of Hanes House are located the administrative offices of the School of Nursing, a large classroom seating 100 persons and equipped with audio-visual aids; a small classroom seating 50 persons and equipped with a screen and movie projector, a nursing laboratory with equipment for nursing practice for students, and conference rooms.

Duke Hospital

Duke Hospital, an integral part of the Medical Center, is a 627-bed, 30-bassinet general hospital which performs the concurrent functions of patient care and professional education. It admits over 20,000 patients a year, and maintains comprehensive diagnostic and treatment facilities for their care.

Different levels of patient care are provided by a minimal care unit and intensive care facilities in addition to conventional nursing units.

Private, semi-private, and ward accommodations are available. Approximate daily patient census by service is as follows: Surgery (including Urology, Otolaryngology, Ophthalmology, and Orthopaedics), 230; Medicine (including Dermatology and Neurology), 150; Pediatrics, 55; Psychiatry, 45; and Obstetrics-Gynecology, 45. Surgical facilities include eighteen operating rooms and a recovery room; over 15,000 surgical procedures are performed annually. Two obstetrical delivery rooms are maintained.

Outpatient services include a public clinic which totals some 121,000 visits a year, a private diagnostic clinic of comparable size, and an active emergency service. All of the hospital components are located within a single building. Close working relationships between Duke Hospital and outside health agencies contribute to continued care.

Duke Hospital is approved for internship and residency training by the Council on Medical Education and Hospitals of the American Medical Association, and conducts an active educational program involving some 280 house staff members. The hospital is fully accredited by the Joint Commission on Accreditation of Hospitals.

Libraries

Nursing Library

A reference library of 6,000 books and periodicals of special interest to students majoring in nursing is located in Hanes House. Students use the general and professional libraries of the University.



University Library

The University library, among the first nineteen university libraries in the country, contains 1,650,000 volumes and 4,000,000 manuscripts. About 60,000 volumes are added annually. Separate departmental and professional school libraries provide notable collections in the several disciplines.

More detailed information may be obtained in a *Student's Guide to the General Library*, available on request to the Librarian of the University.

Medical School Library

The Medical Center Library, located in the Davison Building, attempts to provide all services and collections necessary to further educational, research and clinical activities in the medical field. Extensive reference and bibliographical service is provided. The collection exceeds 70,000 volumes and about 1300 current periodicals are being received, over one hundred of them in duplicate subscriptions.

The Trent Collection in the history of medicine is an unusually fine one, rich in manuscripts and rare books, and provides the opportunity for study and research as well as casual reading in the field.



Student Life: The Undergraduate Student

Living Accommodations

Housing

Hanes House and Hanes House Annex are residence houses for School of Nursing students. House Counselors, who are members of the Dean's staff, live in the respective houses. The counselors, with the cooperation of the Student Government Executive Council, are responsible for the administration of the houses.

Undergraduate students are required to live in the residence houses unless they are married or are living with parents or relatives. Any exception must be approved by the Dean. Rooms are rented for the academic year, but for a period of not less than one semester. No refund of room rent will be made except for involuntary withdrawal to enter the armed services. Such refunds will be made in accordance with the University's established schedule.

Regulations governing the occupancy of rooms will be supplied by the Director of Housing to those students making application for housing. Occupants are expected to abide by these regulations.

Food Services

The dining facilities available to students in the School of Nursing include the Medical Center and West Campus Cafeterias for upperclass students; the Hospital and Graduate Center Cafeterias and the East Campus Union for freshmen and sophomore students. Sophomore and freshman students may not board at places other than those specified. The charge for board is payable, not later than the date of the beginning of each semester, also at the beginning of summer session. Students will not be entitled to a refund on board after the dates of the Fall or Spring mid-semester. (See Calendar.) Junior and senior students will not be required to pay Board fees. These students may purchase meals at any of the dining facilities located on West Campus.

Services Available

Medical Care

Students enrolled in a regular program of studies are eligible for the services offered under the health program of the school.

Complete medical facilities are available to students at the Duke Medical Center under the health program. With the necessary exceptions noted below, this type of care is furnished at a minimum expense to regularly enrolled students. The cost is included in the general fee each semester and in the fees charged for the Summer Session terms.

Physical Examination. Upon admission each student receives a complete physical examination including a chest x-ray. Thereafter, the physical examination is repeated annually; the chest x-ray semi-annually.

Health Office. The health office in Hanes House, under the direction of a physician is maintained for the students in the school. Advice, treatment and examination are available to students during regularly scheduled hours. Consultations with Duke Medical Center staff specialists are arranged through the health office as necessary; arrangements for drugs, dressings, laboratory tests, and x-rays are made as needed.

Hospitalization. A student requiring hospitalization is admitted to Duke Hospital. Admission is arranged through the health office. Medical and surgical care is under the supervision of a senior physician or surgeon. Hospital care includes staff nursing, drugs, dressings, laboratory test and x-rays as needed. Hospital care is limited to thirty days.

If the student is covered by an insurance plan which provides for hospitalization, medical or surgical benefits, the coverage should be applied to the cost of care.

Exceptions. The health program does not cover private duty nursing, refraction of eyes, treatment of teeth, hernias, pilonidal cysts, chronic skin

condition, endocrine disturbances, elective surgery, braces or any orthopaedic appliance, accidents or illness occurring during vacation or while off the campus. Blood used for transfusions must be paid for or replaced.

Psychiatric Consultation. Advisory consultation with a psychiatrist can be arranged at no expense to the student. Further psychotherapeutic interviews are not included in the health program.

Student Health Insurance. A special commercial policy available only to regularly enrolled Duke students can be secured to furnish complementary protection, if desired. The insurance excludes any coverage for accident or illness cared for under the health program; insurance protection is furnished for off the campus and during vacations.

University Counseling Center

The University maintains a Counseling Center which provides a centralized program of educational, vocational, and personal counseling for students. In addition, the Center administers special group testing programs for University schools and departments and serves as the local testing center for a wide variety of national testing programs. The Center also carries on programs of research in the field of measurement and counseling.

Student Activities

Religious Life

"Eruditio et Religio," the motto emblazoned on the seal of the University, proclaims belief in the essential union of knowledge and religion in the educational process. The Gothic Chapel stands at the center of the campus, an inspiring symbol of the place of religion in the well-balanced life. The Chapel program encourages the cultivation of the moral and spiritual life of students.

Opportunities are provided through the Chapel and its related activities to translate worship into effective Christian living. Denominational, interdenominational, and interfaith loyalties are emphasized. Protestant, Roman Catholic, and Jewish students are organized in their respective groups, each having a denominational chaplain or adviser.

The University Religious Council, composed of students and faculty, promotes the interdenominational religious life in its many facets. The work of the Council and of the denominational program is under the supervision of the Chaplain to the University, who is also Director of Religious Life. He, with two Associate Directors of Religious Life and five denominational chaplains, coordinates the religious program of the

campus. These chaplains also offer personal guidance and spiritual counsel to all students in matters related to their faith.

The Dean of the Chapel is a key figure in student religious life. A regular preacher to the University, he preaches in the Chapel each month. He serves as an officiating minister and participates in the planning of the University's religious program.

Additional opportunities for the enrichment of the student's religious life are offered in organ and carillon recitals, choral concerts, other special services held from time to time, and in the sermons of distinguished guest preachers from many lands who are heard in the Duke Chapel. Some students, at their own discretion, participate actively in the program of the downtown churches of their choice.

Professional, Social, and Cultural Organizations

The scope of student organized activities falls into many broad interest areas, such as student government, service, professional, and honorary, publications and radio, music, drama, and social activities.

The Union Building, located on the West Campus, is the student center for coeducational activities. It houses, among other groups, the Student Union organization. This body is unique in its coeducational aspects, bringing the men and women together in the carrying out of its stated purpose "to stimulate, promote, and develop the social, recreational, cultural, educational, and spiritual activities of the students of Duke University." This purpose is carried out through a broad program including lectures, recreational activities, dances, and exhibits, adapted to the leisure time interests and needs of all students, who as undergraduate students are members of the Union.

The musical groups include the Chapel Choir, Women's Chorus, Symphony Orchestra, Concert Band, Glee Clubs, and several smaller groups. The Duke Players present a number of plays and readings each season. The Hoof 'n' Horn Players annually produces a musical comedy which is usually written, cast, directed, and acted by students from Trinity, the Women's College, and the School of Nursing.

Although there are no chapter houses, the program of the thirteen national sororities having chapters on campus are carried on within sections of the regular dormitories set aside for this purpose. Undergraduate women in the University are provided the opportunity to participate in the program of the sororities if they so desire.

Other campus groups, social in nature, sponsor dances, chaperoned cabin parties, concerts, and informal discussion groups. Social functions are frequent enough to afford the relaxation needed from work required in classroom and laboratory.

Student Government Association. The purpose of this organization is to regulate all matters pertaining to the life of the undergraduate woman of Duke University School of Nursing not under the jurisdiction of the

faculty; to increase a sense of individual responsibility; and to cooperate with the faculty in creating and maintaining high ideals for the Duke University School of Nursing. Each student is a member of this Association from the time of her entrance into the School of Nursing until her graduation. An Executive Council, consisting of ten elected members, coordinates the affairs of this Association, conducts the business of the Association in the interim between meetings of the Association, and with the student body is responsible for legislative action.

The Honor System. The purpose of the Honor System is to secure the cooperation of the undergraduate student body in maintaining honorable conduct in all areas of student, professional, and social life. It applies to every undergraduate student in the School of Nursing. The Honor System is a vital directive force in all phases of each student's life and is a major working part of the Student Government Association; it carries its influence into all facets of student activities and makes itself felt by enhancing the individual's feeling of honor.

Santa Filomena. Santa Filomena is a senior honorary society founded at Duke University School of Nursing. Its purpose is to recognize achievement and promote leadership. New members are publicly tapped at the May meeting of Student Government Association. They are selected from the rising Senior class and must fulfill the following three requirements:

1. Maintain a superior average throughout their first two years.
2. Demonstrate superior nursing ability.
3. Make some contribution to the betterment of the School of Nursing.

Santa Filomena strives to serve the nursing profession. Because all proceedings and ceremonies except tapping are secret, this honorary society can perform many varied service activities.

Santa Filomena's color is white; its flower, a white carnation; its pin, a small gold Florence Nightingale lamp.

The North Carolina State Student Nurses Association. As members of the Duke University School of Nursing, students are members of the National Student Nurses' Association through membership in the North Carolina State Student Nurses' Association. Such membership facilitates social relationships and an interchange of ideas with students of various programs of nursing education throughout the state and nation. Participation in the program of the district, state, and national association provides students with the opportunity to work with and learn more about their colleagues of the future.

Publications

Three magazines and a comprehensive year book are published by students. Student publications are under the control of the Publications

Board, composed of members from the University staff appointed by the President, members of junior and senior classes of the four undergraduate colleges, elected by the students of the respective schools, and editors and managers of student publications as *ex officio* members of the Board without voting power. No student publication can be established at the University without the approval of the Board.

Prizes and Awards

Duke University School of Nursing Alumnae Award

The Duke University School of Nursing Alumnae Award is presented to a graduating student by the Alumnae Association for leadership, scholarship and nursing skill.

The Moseley Award

The Moseley Award of \$25.00 is given to the student in the senior class who has shown the most skill in the art of nursing throughout her program in the School of Nursing.

Undergraduate Admission

New students are admitted for the academic year at the opening of school in the fall.

Candidates may qualify for admission as members of the freshman class or as students with advanced standing. Since the enrollment is limited, the Committee on Admissions selects students who, in its judgment, are best qualified to benefit from the educational advantages which the school offers. Selection is based on the academic record of the candidate, on test scores, and on satisfactory evidence of good character and general fitness for college life at Duke. A visit to the campus for a personal interview with members of the faculty is of material benefit to the candidate and to the Committee.

Requirements for Admission

Admission to the Freshman Class

A candidate for admission to the freshman class must present at least fifteen acceptable units of secondary school credit. A minimum of twelve units must be in college preparatory subjects, but it is recommended that fifteen be offered. Subjects classified as college preparatory are English, foreign language, history and social studies, mathematics (Algebra and Geometry), and sciences.

Prospective students are urged to broaden their reading outside of class

during their senior year and to make the acquaintance of books and magazines that do not form part of the subject matter of their courses. At the same time, they should take every opportunity to increase their competence in writing. Those who cannot write simple, clear, grammatical English prose will be progressively at a serious disadvantage in the competition for admission and also in the general work of the Freshman year. Careful attention to correctness in English in correspondence and on application blanks cannot be too seriously stressed for candidates for admission.

Applicants are advised to have their scores on the Scholastic Aptitude Tests and the scores on three achievement tests of the College Entrance Examination Board submitted to the Office of Admissions. Graduate nurse applicants should submit one reference from a faculty member of the School of Nursing from which they were graduated and if applicable, from an employer. Interviews with members of the Duke University School of Nursing faculty are desirable and are encouraged.

Evidence of good health will be requested after the applicant is considered for acceptance. Final acceptance will be contingent on a complete physical examination during the week of Orientation. This examination also includes a chest x-ray, blood and urine studies, and skin tests.

Prerequisites

All applicants for admission to the School of Nursing must present at least fifteen acceptable units of secondary school credit. A unit of credit is allowed for a course of study pursued throughout an academic year at an accredited secondary school, if the course has been completed satisfactorily.

1. Twelve units must be in English, foreign language, history and social studies, mathematics, and natural science; and must include:
 - (a) English—3 units.
 - (b) Algebra—1 unit.
 - (c) Plane geometry—1 unit.
 - (d) Chemistry—1 unit.
2. The remaining units should include a language, physics, and history.

Other units offered in subjects not included in this list will be considered for acceptance on the basis of full statements transmitted with the applicant's record from the school recommending her.

Early Decision Plan

For the well-qualified student who has definitely decided to enter Duke if accepted, the University offers to reserve a place by "early decision" on

December 1 of the student's senior year in secondary school. The deadline date for completing applications for December decision is November 1. Interested students should write to the Office of Admissions for detailed information.

Regular Admission

Candidates for regular admission must apply no later than January 15, and normally do so during the fall of the senior year. For this group, decisions are mailed by April 15.

Candidates for admission to the School of Nursing should address their inquiries to the Office of Admissions, Duke University, Durham, N. C., 27706.

A candidate for admission who wishes to arrange an interview should do so through the Office of Admissions.

Admission to Advanced Standing

Admission by transfer from other institutions may be arranged for a limited number of students, under certain well-defined regulations. All such candidates must submit official transcripts of all work completed at other colleges, accompanied by a statement of honorable dismissal and scores on the Scholastic Aptitude Test of the College Entrance Examination Board. An overall grade average of at least C must have been earned on work previously completed; courses on which a grade less than C has been earned cannot be accepted for transfer credit. Students may not apply for transfer beyond admission to the junior class. Further detailed regulations for admission by transfer may be obtained from the Office of Admissions.

Applicants for advanced standing in the School of Nursing should present, as far as possible, subjects corresponding to those required by the School. They may not, during their first semester, register for more than the minimum number of hours required of the class which they enter, except by permission of the Dean of the School of Nursing.

Graduate nurses applying for admission to advanced standing are required to submit records of previous performance in Nursing, scores on the Scholastic Aptitude Tests and three Achievement Tests.

Special Students

Graduate nurses may be admitted for special work in such courses of instruction as their earlier training and experience may qualify them to take. They may not be admitted as candidates for a degree in the regular course of study unless they are able to meet all normal requirements for admission, which apply to all beginning students.



Readmission of Former Students

Former students who have for various reasons withdrawn from college and who wish to continue their collegiate careers should apply to the Duke University Office of Admissions with a detailed account of their activities since withdrawal from college.

Undergraduate Program: Financial Information

Fees and Expenses

Fees paid by students cover only a part of the cost of their instruction and of the operation of the University. Income from endowment and contributions from the alumni, alumnae, and other public spirited men and women meet the balance, which constitutes more than half the cost.

Estimated Expenses

Certain basic expenditures are to be considered in preparing a student's budget, such as tuition, the general fee, room and board. All financial information is subject to change without notice. The necessary expenditures with a reasonable amount allotted for miscellaneous items such as laundry, organizational dues, and sundry purchases are shown as follows:

	<i>First year</i>	<i>Second year</i>		<i>First year</i>	<i>Second year</i>
Tuition	\$1250.00	\$1250.00	Books*	40.00	40.00
Gen. Fees	187.00	187.00	Activities	15.00	15.00
Room Rent	345.00	345.00	Uniforms*	<u>36.00</u>	<u>51.00</u>
Board	500.00	500.00			
Laundry*	20.00	20.00		2393.00	2408.00

* Approximate cost.

	<i>Third year</i>	<i>Fourth year</i>		<i>Third year</i>	<i>Fourth year</i>
Tuition	\$1250.00	\$1250.00	Books†	40.00	10.00
Gen. Fees	187.00	187.00	Activities	15.00	15.00
Room Rent	345.00	345.00	Uniforms†		20.00
Board	°	°			
Laundry†	20.00	20.00		1857.00	1847.00

*Summer Session***

Room Rent	55.50	111.00
Board	85.00	170.00
Laundry†	3.00	6.00
Books†	10.00	20.00
	<u>153.50</u>	<u>307.00</u>

*No board charges will be made for Junior and Senior students. These students will pay for meals on a "pay by the meal" basis. Board costs may be estimated at \$60 per month.

**Charges for one Summer term for each of first three years. Students normally enroll for three terms.

†Approximate cost.

Tuition and Fees

Tuition and General Fee. The tuition of \$625.00 and the general fee of \$93.50 are due and payable not later than the date of the beginning of a particular semester. No refund of the tuition or the general fee will be made except for involuntary withdrawal to enter the armed services.

Bills may be sent to parents or guardians provided the Treasurer has been requested in writing to do so. Failure to pay bills on or before the due dates will debar the student from class attendance until the account is settled in full.

No records are released and no student is considered by the faculty as a candidate for graduation until she has settled with the Treasurer for all indebtedness.

Registration Fees and Deposits. New students, on notification of acceptance, are required to pay a non-refundable first registration fee of \$20.00 and to make a deposit of \$50.00. The \$50.00 deposit will not be refunded to accepted applicants who fail to matriculate. For those who do matriculate, \$25.00 of the deposit serves as a continuing room deposit for successive semesters, and the remaining \$25.00 as a continuing registration deposit.

Refunds. The initial \$25.00 room deposit is effective for the entire college course of the student whose attendance during regular terms is continuous. The deposit will be refunded to resident students under the following conditions: (a) within thirty (30) days after the student has

been graduated, (b) upon student's withdrawal from the University residence halls provided a written notice is received by the Director of Housing by August 1 for cancellation of reservation for the fall semester and not later than January 15 for cancellation of reservation for the spring semester, (c) when the reasons requiring withdrawal are beyond the student's control. No refund is made until the occupant has checked out of her room through the Housing bureau and has settled all her accounts with the Bursar.



Late Registration Fee. Students who register in either semester at a date later than that prescribed must pay to the Treasurer a fee of \$5.00.

Readmission Fee. Students who have been re-admitted to the University after an absence of one or more terms on notification of re-admission, are required to make the \$50.00 room rent and registration deposit.

Room reservations are made with the Director of Housing. An applicant who has been officially accepted as a resident student is assigned a room according to an established plan.

The Summer Session

University fees for Summer Session 1966 will be charged at the rate of \$40.00 per semester hour for those admitted with advanced standing. Board for resident students is charged at the rate of \$85.00 for each term of Summer Session, room is \$55.50 per person for a term of Summer Session. The cost of laundry is approximately \$.50 per week. A bill is sent to all pre-registered students to permit payment in advance.

Fees for Special Students. Part time special students who register for no more than two courses with a maximum total credit of eight semester hours are charged a registration fee of \$5.00 for each course and \$42.00 for each semester hour. Registration for 9 or more semester hours or 3 or more courses, requires payment of full fees.

Fees for Auditing. Auditing of one or more courses without charge is allowed students paying full fees, provided that the consent of the instructor is obtained. Students who are enrolled for not less than 3 nor more than eight semester hours may audit other courses by payment of \$21.00 for each course audited. Auditors submit no daily work, take no examinations, and receive no credit for courses audited.

Transcript and Fees. A student who wishes to transfer his credits from Duke University to another institution is entitled to one free transcript of his record. A fee of one dollar, payable in advance, is charged for each additional copy. Requests are directed to the Records Office.

Fees for Course Change. Changes in courses for reasons not arising within the University require a payment of \$1.00 for each change made.

Living Expenses

Housing. Hanes House and Hanes House Annex are residence houses for School of Nursing students. Undergraduate students are required to live in the residence houses unless they are married or are living with parents or relatives. Any exception must be approved by the Dean. Rooms are rented for the academic year, but for a period of not less than one semester. No refund of room rent will be made except for involuntary withdrawal to enter the armed services. Such refunds will be made in accordance with the University's established schedule.

The rental charge for a single room is \$415.00 for an academic year or \$207.50 per semester. The rental charge per person for a double room is \$345.00 for an academic year or \$172.50 per semester. The rental charge for a single room for a six week summer session term is \$67.00; the rental charge per person for a double room for a six week summer session term is \$55.50.

Food Services. The charge for board is payable not later than the date of the beginning of each semester, also at the beginning of summer session. Students will not be entitled to a refund on board after the dates of the Fall or Spring mid-semester. (See Calendar.) Junior and senior students will not be required to pay Board fees. These students may purchase meals at any of the dining facilities located on West campus.

Student Aid

Duke University is interested in students with ability and ambition. It is the aim of the University Financial Aid Committee and others affiliated with the Financial Aid Program to provide, insofar as possible, the financial assistance required by students accepted for entrance who are unable to defray the cost of college from their own resources. The assistance is made available in the form of scholarships, grants-in-aid, loans and part-time employment.

Scholarships

Scholarships intended to recognize outstanding students are awarded annually to candidates who evidence qualities which give high promise of excellence in Nursing.

Candidates for competitive scholarship prizes should initiate applications during the fall semester of the senior year of study in secondary school. Instructions concerning the specific requirements and deadline dates will accompany the application materials sent to applicants for these awards.

A maximum of eleven scholarships will be awarded annually without reference to geographical area.

All candidates for scholarships are required to take the Scholastic Aptitude Test and three Achievement Tests; English Composition is required as one of the three Achievement Tests of the College Entrance Examination Board in order to qualify for consideration by the Scholarship Committee. The test must be taken either in December or January prior to the September in which admission is sought.

Objective. These awards are scholarships based on merit. They are intended to encourage young women who give promise of becoming leaders in the field of nursing. Financial need is not a factor in making

the awards. The size of the stipend assigned to each winner, however, will vary to some extent with the financial circumstances of the recipient. An honorary stipend for students needing no assistance will be \$200.00.

Eligibility. A student must be accepted for enrollment to the freshman class of the Duke University School of Nursing in the ensuing academic year to be eligible for consideration for a scholarship award.

Procedure. All candidates for Duke University School of Nursing Scholarships and grants-in-aid who wish to be considered for awards on the basis of their financial circumstances are required to complete the Parents' Confidential Statement of the college scholarship service. This statement may ordinarily be obtained from the high school guidance counselor or principal. Application for scholarship must be submitted by January 1 to the Office of Admissions, Duke University, Durham, North Carolina.

Method of Selection. A scholarship Committee of Duke University faculty members will select the winners and alternates on the basis of the applications submitted. All applicants for scholarship will be notified of their eligibility for competition by March 15.

The Scholarships will be awarded on the following basis:

1. Secondary school scholastic record (candidates will be restricted to the highest quarter of their classes).
2. College aptitude as shown by tests, particularly the Scholastic Aptitude Test and the Achievement Tests of the College Entrance Examination Board.
3. Breadth of interests and native ability as indicated by extra-curricular activities.
4. Participation in church, civic, and other organizations with particular reference to the demonstration of qualities of leadership.

Duration of Award. The award will be made for one year renewable for a second year on the condition that the holder maintain a scholastic average in the top quarter of her class or a "B" average, and further that she show evidence of developing the qualities of leadership which served as the basis for the original selection. The maximum duration of the award will be two years.

Psychiatric Nursing Undergraduate Training Grant Awards

A limited number of Psychiatric Nursing Undergraduate Training Grant Awards are available to qualified Junior and Senior students. An award provides for an annual stipend plus tuition fees. Additional information about the Psychiatric Nursing Undergraduate Training Grant Awards may be secured in the Dean's office.

To qualify for an award, the student must have an above average

academic record and the potential for admission to graduate study, and must declare intent to pursue a career in the field of Mental Health.

Army and Navy Nurse Corps Student Program

Students in the Basic Nursing Programs may apply for appointments in the Army Student Nurse Program at the beginning of their Junior year, or the Navy Nurse Corps Candidate Program at the beginning of their Senior year. The appointments carry generous financial allowance. A student who participates twelve months or less serves on active duty in the respective service for twenty-four months. If two years support has been given, she serves thirty-six months.

Grants-in-Aid

Although sufficient funds are not available to assist all applicants who present requests for aid, a number of grants-in-aid are made each year to able students who need financial assistance in order to meet the cost of attending college. Any candidate for admission, therefore, who considers herself to be in such need is eligible to apply for a grant-in-aid.

Applicants for grants-in-aid will be required to submit a detailed statement of financial resources.

Florence K. Wilson Scholarship Fund. This fund is available to nursing students who apply for grants-in-aid.

It was established in 1961 by combining the Nurses' Alumnae Association Scholarship Fund, the students' Florence K. Wilson Scholarship Fund and contributions from the Wilson family and friends. The income of this fund is to be used for scholarships for students enrolled in the School of Nursing.

Remissions of Tuition

Certain students attending Duke University are entitled to a remission of the University tuition charge. Students in this group are entitled to a maximum of eight semesters of free tuition at the undergraduate level. Each Summer Session in which work is taken and each semester spent in another institution will be counted as one of the eight allowable semesters. Only those students enrolled in the regular Nursing School program leading to a Bachelor of Science degree in Nursing are entitled to a remission of tuition charge.

Children of ministers who are members of the North Carolina or Western North Carolina Conferences of the Methodist Church are entitled to a remission of the University Tuition charge, as are the children of ministers of all faiths residing in Durham County, North Carolina. This consideration is given only to children of resident members of the two

North Carolina conferences who are giving their full time to religious work.

Tuition Grants

Tuition grants are given to the children, step-children, and adopted children of certain qualified staff members of Duke University.

Loans

Since the attainment of college education, like the purchase of a home, is an expensive undertaking students may find it necessary to borrow a portion of the funds required. Duke University has student loan funds available which supplement the program of scholarships and grants-in-aid. All candidates for loans must make a minimum grade of "C" in the semester preceding their application for a loan. Freshmen, therefore, will ordinarily be recommended by the University Scholarship Committee for a student loan which will not exceed the amount of tuition for the second semester.

Loans are granted from the Joseph F. Stein Student Loan Fund by the University Loan Committee upon the recommendation of the Dean of the School of Nursing. This fund was established to provide a means of assistance to students to meet pressing financial problems. The amounts to be loaned are limited in size and will not be charged interest rates if paid prior to termination of the program or if the student completes her program. Should a student, with an outstanding loan, withdraw from the school before she has completed her program, interest will accrue at 3% per annum for the first five years; 6% per annum after 3% ceases to be effective. Monthly payments shall be made on the first day of the next following October and continuing on the first day of each month thereafter of at least two per cent of the amount of the principal balance on the June 30th next prior to the date on which the first such monthly payment becomes due.



Undergraduate Registration and Regulations

Registration

Students in residence are required to submit, not later than the date of the spring registration, cards showing their selection of courses for the following year. Evidence of the payment of the continuing preregistration deposit of \$25.00 is required before the card may be submitted. These cards, approved by the Dean, are filed for permanent record in the Central Records Office. Students who do not select their courses for the following year at the time appointed must be readmitted to the college by application to the Committee on Admissions. The same regulations, with the exception of the advance deposit, apply to registration for the spring semester.

Students who register in either semester at a date later than that prescribed must pay to the Treasurer a fee of \$5.00. They are counted as absent in the work they have missed in the professional courses to which they are admitted, and these absences carry the same penalty as do other absences from the professional courses. Changes in courses for reasons not arising within the University require a payment of \$1.00 for each change made. No course may be elected later than one week after the opening of the semester, and no student may be admitted to any class without an official enrollment.

Academic Regulations

Orientation Program

All Freshmen and transfer students are required to participate in the activities of Orientation Week. The program includes placement tests, orientation lectures, physical examinations, social events, special religious services, registration, and enrollment. New students who miss the whole or a part of the Orientation Program place themselves at a serious disadvantage at the very outset of their college career.

Health Regulations

Before admission to the School of Nursing, a student is required to have a physical examination by the family physician and to be immunized against typhoid fever, diphtheria, tetanus, smallpox, and poliomyelitis. Physical defects, such as defective vision, dental needs, etc., must be corrected before admission.

Before final acceptance, each student is required to undergo a physical examination under the School's direction during Orientation. Students whose condition needs further observation may be admitted tentatively, but must cancel their applications if findings prove them physically unable to pursue the program.

First Aid Course

All students are advised to complete a Standard Red Cross First Aid Course before the date of enrollment in the School of Nursing. For those students who will find it impossible to complete such a course in their home communities, the local Red Cross Chapter will offer this course at the School of Nursing. Because of the heavy course load, the student will be at a disadvantage in planning to complete the course at the School of Nursing.

Course Requirements

The normal load of a student is four or five academic and professional courses during the first, second, and third years (exclusive of physical education) or six to nine semester hours per quarter during the fourth year. No student is permitted to take less than twelve semester hours of work per semester during the first, second, and third years or six semester hours per quarter during the fourth year or more than the normal load during any part of her program without special permission from the Dean.

Grading

Grades are reported to indicate the following:

Passed. A, B, C, and D are all passing grades. The letters are intended to indicate the following quality of work. A, exceptional; B, superior; C, average; D, low pass.

Failed. A grade of F indicates that the student has failed the course, and in order to receive credit for the course she must repeat the work in class.

Incomplete work. If because of illness or other emergency a student's work in a course is incomplete, she may receive an I for the course instead of a final grade. Incomplete courses must be completed before the close of the succeeding semester; otherwise the I is converted to an F and the course must be repeated in class if the student is to receive credit for it. In case a student whose work is incomplete is also absent from a final examination, she receives an X for the course.

Withdrawal. The letter W is used to indicate official withdrawal from a course. If a student drops a course without permission from the Dean, the grade for that course is recorded as F. If she drops with permission a course in which she is failing, the grade for that course is recorded as F unless, in the judgment of the Dean, circumstances do not justify this penalty.

Reports. Reports on proficiency in academic work are sent to parents or guardians after the examinations at the end of each semester. In addition, six-weeks advisory grade reports on freshmen are mailed each semester.

Credits

The term of credit used is the semester hour which signifies one class period a week throughout the semester. Two or four hours of laboratory work are equivalent to one hour of class work. Two semesters of seven-week weeks each or three quarters of twelve weeks each constitute the academic year. For the degree of Bachelor of Science in Nursing, credit for 132 semester hours is required.

Transfer Credits. Transfer credit, in which grades of C or above have been earned, is rated at two quality points per semester hour. Courses in which grades of less than C have been earned are not acceptable for credit.

Although credit for work completed at other institutions will be determined in relation to the curriculum requirements of the School of Nursing, an overall average grade of C on all previous work taken is required before consideration for advanced standing may be given.

A student who transfers with advanced standing to the School of Nursing from a junior college must be enrolled for at least one semester before transfer of credit will be accepted. Credit for courses in science

offered for advanced standing by a transfer from a junior college will be determined by the departments concerned.

The maximum amount of credit acceptable from a junior college is 60 semester hours, exclusive of physical education. No credit is given for work completed by correspondence, and credit for no more than six semester hours is allowed for extension courses. Any extension work accepted must be approved by the dean.

Residence Requirements. The final two years of senior-level work in the School must be earned in residence. Students who meet this requirement but who still lack six or eight semester hours in final fulfillment of requirements may take this work in another institution of approved standing, provided the course is approved by the head of the department concerned and by the Dean.

Students who complete in a summer session the work required by the University for the degree will be granted the degree at the end of the summer.

Quality Points and Class Standing

The requirements for the degree are computed in semester hours and in quality points. Quality points are determined by grades as follows: for an A, four quality points for each semester hour; for a B, three quality points for each semester hour; for a C, two quality points for each semester hour; for a D, one quality point for each semester hour; for an F, no quality points. Credit for at least 264 quality points is required for the degree of Bachelor of Science in Nursing.

Requirements for Continuation in College and for Graduation from College. To continue in college and to graduate, students must, in addition to the requirements listed elsewhere in this Bulletin, pass a minimum number of semester hours, achieve a specified quality point ratio, and in the case of graduation earn a minimum number of quality points. The quality point ratio is calculated by dividing the accumulated number of quality points earned by the accumulated number of semester hours carried (not semester hours passed). These requirements are listed in the following table.

For continuation from	The minimum requirement is
The first to the second year	24 s.h. credit and a q.p.r. of 1.30
The second to the third year	56 s.h. credit and a q.p.r. of 1.60
The third to the fourth year	80 s.h. credit and a q.p.r. of 1.75
The fourth to the fifth year (if needed)	114 s.h. credit and a q.p.r. of 1.85

For graduation the minimum requirement is 132 semester hours, 264 quality points, and a quality point ratio of 1.9.

In addition to the qualitative standards listed above students must pass

a minimum number of hours each semester. First year students must pass at least six semester hours of work in their first semester and eighteen semester hours in their first year exclusive of physical education; all other students must pass at least nine semester hours each semester. Third and fourth year students are expected to maintain a "C average" in nursing. The University may require a student whose record is considered unsatisfactory to withdraw, although the minimum requirements set forth in this paragraph have been met. Any student whose standing in the School of Nursing is below an acceptable level, in either academic or clinical courses, may be, after careful evaluation by the faculty, required to withdraw from the school.

Class Attendance Regulations

The attendance regulations specifically place the responsibility for class attendance upon the individual student. A student is expected to attend his classes regularly and punctually. It should be recognized that one of the most vital aspects of a residential college experience is attendance in the classroom, and that the value of this academic experience cannot be fully measured by testing procedures alone. The members of the student body are considered sufficiently mature to appreciate the necessity of regular attendance, to accept this personal responsibility, and to demonstrate the kind of self-discipline essential for such performance, and, conversely, to recognize and accept the consequences of failure to attend. Instructors are privileged to refer to the dean for appropriate action any student who in their opinion is causing his work or that of the class to suffer because of absences or latenesses.

Absences from classes due to illness will be excused when certified by a proper medical official. Absences from classes due to authorized representation of the University may be excused. Officials in charge of groups representing the University are required to submit names of those persons to be excused to the appropriate dean's office forty-eight hours in advance of the hour when their absences are to commence.

Eligibility for Academic Honors

Dean's List. In recognition of academic achievement, students who earn an average quality point ratio of 3.0 or higher on a semester's work of not less than the minimum academic load are placed on the Dean's list.

Class Scholars. A student in each class of the School of Nursing who achieves the highest quality point ratio on at least a normal course load for each academic year shall be designated a Class Scholar.

Class Honors. To be eligible for Class Honors a student must earn, during the year, credit for at least the minimum academic load permitted by the college in which she is registered. All semester hours on which a

student receives a grade are counted in the determination of Class Honors. Students in the freshman, sophomore and junior classes who earn a 3.50 quality point ratio are eligible for Class Honors.

Graduation Honors. To be eligible for consideration for Graduation Honors at graduation a student must have completed in residence a minimum of ninety semester hours. Students who earn an average of at least a quality point ratio of 3.50 are recommended for a degree *magna cum laude*. Those who earn a quality point ratio of 3.75 are recommended for a degree *summa cum laude*.

Nonacademic Regulations

Conduct and Discipline

The University expects of its students loyal and hearty cooperation in developing and maintaining high standards of conduct as well as of scholarship. General University regulations concerning conduct of students will be made available to students when admission is offered, or under other circumstances, upon request. The student in accepting admission indicates a willingness to subscribe to those regulations. The University therefore reserves the right, and matriculation by the student is a concession of this right, to ask the withdrawal of any student whose conduct at any time is not satisfactory to the University, even though no specific charge may be made against the student.

General oversight of the conduct of students and the administering of discipline are under the supervision of the Vice President in the Division of Student Life. Immediate supervision is entrusted to the Dean. However, through the expressed willingness of the students of the University to assume the responsibility of maintaining high standards of morals and honor, the student body has properly become to a great degree self-governing. The duly elected representatives of the student body, exercise the authority granted the students to investigate all cases of misconduct, as well as all other cases of violation of proper student standards and traditions, and to make recommendations of penalties based on their findings. They exert a guiding and stimulating influence for the promotion of high ideals of conduct and of student relationships.

Motor Vehicles

Freshmen are not advised to own or operate motor vehicles at the University. Members of the upper classes may operate motor vehicles, however, when in accordance with University regulations.

Each student possessing or maintaining a motor vehicle at Duke University shall register it annually at the beginning of the fall semester. If



a student acquires a motor vehicle and maintains the same at Duke University after enrollment, he must immediately register it. Resident students are required to pay an annual parking fee of \$30.00 for each motor vehicle, excepting that a parking fee of \$10.00 is required for each motorcycle, motorbike, or motor scooter.

At the time of registration of a motor vehicle, the following documents must be presented:

1. State vehicle registration certificate.
2. Valid driver's license.
3. Satisfactory evidence of automobile liability insurance coverage with limits of at least \$5,000.00 per person and \$10,000.00 per accident for personal injuries, and \$5,000.00 for property damage as required by North Carolina Motor Vehicle Law.
4. If the student is under 21, a statement signed by the student's parent or guardian granting the student permission to operate a motor vehicle at Duke University.

Undergraduate Courses of Instruction

For description of courses to fulfill elective requirements refer to the *Bulletin of Undergraduate Instruction*.

Required Undergraduate Courses

English

1-2. Freshman Composition. Training in composition through the writing of weekly expository themes. The theme subjects derive from assigned reading drawn from British and American literature of the 20th Century. English 1 takes up the Essay, the Short Story, and the Novel; English 2, the Play and the Poem. The student attends each week (1) a general lecture on the reading for the week; (2) a section meeting, where the instructor and a small group discuss problems of composition and literature; and (3) an individual conference in which the instructor reads and grades the weekly theme and makes special assignments according to the needs of the student. 6 s.h. *Staff*

Physical Education

Required Physical Education. Two semester hours of physical educa-

tion are required and normally completed in the first year. Students may elect activities in sports or dance with the possibility of four different choices in the year's requirement.

At the beginning of the freshman year, each student is tested in posture, sports fundamentals, and swimming. For those whose test scores are low, remedial courses in these basic skills are suggested. A swimming course is required for those who do not pass the elementary swimming test. *McCue, Bookhout, Lewis, Eddy, Holton, Lloyd, Spangler, Woodyard, Wray, and Raynor*

Psychology

91. *Introductory Psychology.* An introduction to the facts, principles, and problems of normal adult psychology through a study of psychological methods as applied to motivation, emotions, perception, sensation, thinking, memory, learning, individual differences, and personality. 3 s.h. *Staff*

116. *Psychology of Personality.* A comparative study of personality theories, with an emphasis upon personality structure, dynamics and development. Therapeutic activities in relation to specific personality theories will be discussed. 3 s.h. *Crovitz*

Sociology

91. *Introduction to Sociology: Concepts and Procedures.* Concepts and procedures of sociology and illustrations of their use in understanding specific areas of social life. 3 s.h. Open to Freshmen. *Staff*

150. *The Family.* Analysis of the American family as an institutionalized group and its relationship with other institutions and structural features such as social class and ethnic group. Special attention is devoted to methods of research in this area. 3 s.h. *Kerckhoff*

Nursing and Nursing Related Sciences

N 1-2. *Interpersonal Relations in Nursing.* This is an introductory course which is designed to assist the student in further developing concepts and skills that are basic to competence in interpersonal relations and nursing therapy. The student begins to define and amplify her concepts of the role of the professional nurse. Content of the course is based on the belief that a conscious possession of interpersonal concepts and goal directed behavior is basic to professional management of nurse-patient situations. A limited number of supervised short interviews with in-patients is arranged. 4 s.h. *Dunham, Culver, and Staff*

N 4. Microbiology. A survey of the principles and techniques of microbiology and immunology with special emphasis on their applications to nursing. 3 s.h. *Nielsen*

N 50. Chemistry. A course in the fundamentals of general inorganic chemistry with particular emphasis on introduction to organic chemistry. 3 s.h. *Thiers and Bernheim*

N 51. Introduction to Biochemistry. This course is designed to aid the student in understanding the chemical mechanism of the human body both in health and in disease. The student also acquires knowledge concerning the chemical basis of diagnosis and therapy. 3 s.h. *Thiers and Bernheim*

N 52. Human Anatomy and Physiology. A study of the normal structure and functions of the human body. 4 s.h. *Tosteson, Markee, and Staff*

N 53. Normal and Therapeutic Nutrition. Food needs are studied of individuals throughout the life cycle and within the spectrum of health, acute and chronic illness. Some accepted principles are presented on which dietary modifications are based, as are current practices based on these principles. 3 s.h. *Ferguson and Staff*

N 91-92. The Fundamentals of Nursing. A study of the fundamentals of nursing aimed at presenting the student with a basic knowledge and understanding of the principles and skills of nursing care. The student has correlated experiences in patient care and has the opportunity to participate in patient-centered conferences. Both of these are designed to assist her in the process of integrating the concepts of the behavioral and natural sciences in her approach to solving nursing care problems. Emphasis is placed upon the beginning development of the role of the nurse and upon nurse-patient relationships. N 91 is offered in the Fall semester and N 92 in the Spring semester. Each course has three semester hours of lecture, two semester hours of lecture-discussion and one semester hour of clinical laboratory experience. 6 s.h. each semester. *Gover, Ahlgren, Nolan, Craig, Straub, and Phillips*

N 120. Pediatric Nursing. Designed to help the student acquire the basic knowledge, understanding, and nursing skills necessary for the promotion of comfort, health, and safety of children. Focus is on child care and the nurse-child-family relationship. 6 s.h. *Horton and Schwab*

N 130. Obstetric Nursing. Designed to help the student acquire the basic knowledge, understanding, and nursing skills necessary for the promotion of comfort, health, and safety of the mother and newborn infant during the reproductive experience. 6 s.h. *Horton, Proctor, Hogue, and Riecken*

N 141. Medical-Surgical Nursing Theory. 5 s.h.

N 142. Medical-Surgical Nursing Practicum. 4 s.h.

These courses are designed to assist the student in acquiring knowledge and developing skills basic to identifying and meeting the nursing needs

of adult patients with health problems that require medical-surgical intervention. Experiences are planned to increase the student's understanding of the need for continuity of nursing care and to enhance her ability to implement this as she cares for patients in various medical and surgical settings. These courses must be taken concurrently, and both must be completed satisfactorily in order to receive credit for either course. *Harris, Crane, Lawrence, Norville, and Kintzel*

N 155. Social Forces and Community Health. Analysis of community action designed to alleviate universal health, welfare and educational problems. Demonstrate the concomitance of social, economic and cultural patterns with social legislation. Course is to be taken concurrently with N 141-N 142. 3 s.h. *Harris*

N 160. Social Foundation of Nursing. A survey of major historical, philosophical, and sociological factors which have affected Nursing and Nursing Education. The purpose of the course is to give the student a better understanding of the place of nursing in present day society and the responsibilities of the individual nurse to society. 3 s.h. *Jacobansky and Burch*

N 170. Psychiatric Nursing. This course focuses on dynamic psychiatric nursing. It is taught within the frame of reference of interpersonal theory, communication theory, problem solving process and dynamic psychiatry. It provides opportunities for learning under supervision through experiences in a one-to-one relationship with a hospitalized psychiatric patient. 6 s.h. *Parks and Phillips*

N 171. Psychiatric Nursing Group Work. This is an honors elective course designed to provide knowledge of basic concepts and principles related to dynamics of small group functioning. It provides opportunity for experimental learning as a group member and for experiences as a group leader with a small group of psychiatric patients. 1 s.h. *Parks and Phillips*

N 180. Public Health Science. A body of knowledge derived from the field of public health which includes an introduction to public health administration, environmental sanitation, bio-statistics and epidemiology. 3 s.h. Prerequisite to N 181. *Campbell and Visiting Lecturers*

N 181. Public Health Nursing. The philosophy, principles and processes of nursing in a public health setting, with application through selected learning experiences in the Durham community. 6 s.h. *Campbell, Persing, Young, and Hester*

N 191. Team Leadership and Intensive Nursing Care. The course is designed to assist the student to use concepts of administration in a team leadership role, to increase her competency in complex nursing care and to apply simple scientific methodological skills to the selection and systematic investigation of a problem in nursing. 6 s.h. *Fortune, Minnear, Harris, and Davenport*

The Graduate Program in Nursing

Philosophy and Purpose of Graduate Education

At Duke University, Graduate Study in Nursing operates within the organizational structure of the School of Nursing and derives its rights and responsibilities from the statutes of Duke University. It conducts its educational programs in accordance with policies which regulate the educational status of graduate students within this University. While the School of Nursing regulates its own educational affairs, the graduate faculty in nursing maintains a cooperative relationship with other faculties within the University and utilizes the educational resources of other graduate programs that are appropriate to its purposes.

Fundamental to Graduate Study in Nursing is the philosophy of Duke University as epitomized by its motto (*Eruditio et Religio*), which "reflects a fundamental faith in the union of knowledge and religion, the advancement of learning, the defense of scholarship, the love of freedom and truth, a spirit of tolerance, and a rendering of the greatest service to the individual, the state, the nation and the church. Through changing generations of students, the objective has been to encourage each individual to achieve to the extent of his capacities an understanding and appreciation of the world in which he lives, his relationship to it, his opportunities and his responsibilities."

Graduate Study in Nursing takes its direction from the belief that nursing is a social institution designed to serve man in relation to his health status as determined by his preventive, therapeutic, and rehabilitative health needs. It draws from philosophy and from the natural and social sciences knowledges applicable to its own professional problems.

Graduate Study in Nursing contributes to the advancement of the profession of nursing by the development of understandings and abilities essential to leadership roles in nursing and their correlation with those of other health disciplines, to an extension of nursing knowledge and its application to current and emerging health needs of society, and to effective group functioning.

The ultimate aim of Graduate Study in Nursing is the improvement of nursing practice and of nursing education. To this end, Graduate Study in Nursing furthers individual professional development and fosters the use of thought processes such as analysis, synthesis, and evaluation essential to the solution of problems associated with the provision of nursing services and the education and supervision of nursing personnel. It provides organized programs of study designed to realize its aim.

At Duke University, Graduate Study in Nursing has as its purpose the provision of learning opportunities for graduates of accredited baccalaureate programs in nursing to develop: advanced nursing competency in patient care; ability to communicate these learnings through the process of teaching and supervising in nursing; ability to critically consume, utilize, promote and participate in research in nursing and allied health fields; and ability to assume and use leadership roles and resources for the advancement of the Profession of Nursing and for continued professional growth.

The Master of Science in Nursing

The Degree of Master of Science is offered in Advanced Nursing.

Requirements for Degree

The following requirements are necessary for the Master of Science Degree in Nursing.

1. Satisfaction of subject matter deficits in undergraduate study that have resulted in provisional admission to graduate study, such as psychiatric and public health nursing and educational psychology or their equivalents.
2. Matriculation for the Degree of Master of Science in Nursing upon satisfactory completion of the initial 12 units of graduate work and the approval of the Director of Graduate Studies.

3. Satisfactory completion of the program of studies.
4. Passed comprehensive examination.

The emphasis in the program is the exploration of the theoretical foundation for nurse practice based on scientific processes. Freedom of curriculum selection to permit area of concentration in relation to individual interests and capabilities is encouraged. Courses are selected in relation to individuals ultimate goals.

The core content provides the individual an opportunity to familiarize herself with scientific methods relating to nurse practice, to design nursing research projects, and to begin to develop nursing practice theory in a selected area.

Twenty-one units make up the core requirements. The remaining seventeen units provides the individual an opportunity to elect courses related to area of concentration. If a student wishes to specialize in geriatric nursing, in addition to focus within the core, she may elect such courses as:

Soc. 278—Social Structure and the Life Cycle, The Aged.
Processes of Aging.
Human Behavior-Cerebral Dysfunction

Whereas, if she elects to become a teacher of nursing, she may choose:

Ed. 217—The Psychological Principles of Education
Ed. 333—Seminar in Higher Education

Throughout the year, focus will be on clinical practice; therefore, the student will use the laboratories located in the medical complex in relation to selected explorations of the nursing focus and its effectiveness in patient care.

The program of study covers two semesters and the full summer session. Students are admitted in the fall of each year.

Advanced Nursing Program

<i>Core Courses</i>	<i>Units</i>
N 250-251. Human Behavior and Psychophysiology*	4
N 261-262. Development of Nursing Theory	6
N 265 Methods of Research in Nursing	3
N 269 Thesis Research	3
N 290 Statistical Inference	3
N 311 Seminar in Selected Nursing Problems	2
Total	21

Related Courses. Selected in relation to interests and capabilities.

*M 261-262 Human Physiology (May be substituted if individual meets prerequisites)

Student Life: The Graduate Student

Living Accommodations

Housing

Graduate students in the School of Nursing may occupy rooms in the Graduate Residence Hall. Rooms are rented for a period of not less than one semester unless special arrangements are made through the Housing Bureau after official acceptance for admission to the University. Students may arrange for apartments or rooms in private homes in the city. The Housing Bureau of the University maintains a file of rooms and apartments listed with it for rental. Students may use this file as an aid to locating suitable living accommodations.

Food Services

Food service on both the Woman's College Campus and the West Campus is cafeteria style. The dining facilities on the West Campus include three cafeterias with multiple-choice menus, a grill, and, in addition, the Oak Room where full meals and a la carte items are served. The Men's Graduate Center has a cafeteria open at meal hours, and a coffee lounge which is open until 11:00 p.m. The prices are the same as in the West

Campus Union. Because of the large number of those served in the dining halls, it is not possible to arrange special diets for individual students.

Services Available

Medical Care

The complete medical facilities of the Duke University Medical Center are available to all members of the University community. To secure the benefits of the Student Health program, a graduate student during the term or semester in which the illness occurs must (1) in the Summer Session term be registered for at least 3 units, (2) prior to completing minimum residence requirements be registered for at least 9 units per semester. Students are not covered during vacations and their dependents and members of their family are not covered at any time. Care is provided at the Health Office in Hanes House.

The service provided includes hospitalization in Duke Hospital, when recommended by the Hospital staff, to a limit of thirty days; medical and surgical care under the supervision of a senior physician or surgeon; drugs, X-ray work, and ward nursing. Students pay for board while in the hospital. Excluded from the service are refraction of eyes, treatment of teeth and of all chronic and pre-existing conditions, and elective surgery.

Graduate students are urged to carry adequate health insurance to supplement Student Health Program services. If students have insurance providing hospitalization, surgical, or medical benefits, the benefit shall be applied to the cost of their medical care.

Recreational Facilities

Graduate students new to Duke University may be reminded that they are welcome to use such recreation facilities as swimming pools, tennis courts, golf course, and to affiliate with choral, drama, and religious groups. They may become junior members of the American Association of University Professors.

Graduate Admission

Requirements for Admission

1. Completion of an NLN accredited baccalaureate degree program in nursing which prepares for professional practice in all fields of nursing. (Provisional admission may be granted to applicants not fully meeting this requirement.)
2. A record of undergraduate study that meets general standards for admission to graduate study at Duke University.
3. State registration for the practice of nursing.
4. Two recommendations from persons who are acquainted with the applicant's professional ability and capacity for graduate study.
5. Satisfactory health appraisal.
6. A personal interview may be required.

Procedure for Admission

Interested nurses should write to the Director of Graduate Studies, School of Nursing, Duke University, Durham, North Carolina. A brief biographical statement should be included in this letter. The nurse will be furnished an application form. In addition to the completed form the following supporting documents should be provided: (1) transcripts of all undergraduate and graduate work mailed directly by registrars; (2) two

letters of recommendation written by persons qualified to judge the applicant's professional ability and capacity for graduate study; (3) a record of health appraisal; (4) evidence of registration to practice nursing; and (5) scores on qualifying examinations when requested.

Deadlines for Applications

The application and all supporting documents should be submitted to the Office of Admissions School of Nursing not later than June 1 by those applying for the fall semester; before May 12 for admission to the first term of summer; and before June 18 for admission to the second term. It is the student's responsibility to make certain that her application is complete and in order before the dates specified. Students who are applying for Traineeship assistance are advised to assemble their credentials early in the calendar year in which they anticipate admission to graduate study.

Notification and Status

When the application is approved, the student will receive a letter of admission. The process of admission is not complete until a statement of acceptance has been returned by the applicant.

Applicants who are admitted will be offered either full admission or provisional admission. Provisional admission to one semester or a minimum of 12 hours of course work is offered to students who do not fully comply with admission requirements but appear to warrant admission. Graduate credit earned under *provisional status* may be applied toward an advanced degree at Duke University if and when upon review the student is granted full admission.



Graduate Program: Financial Information

Fees and Expenses

Tuition and General Fees

The following tables show the general fees and charges collected from all students. All fees for each semester are due and payable, unless otherwise specified, at the time of registration for that semester. No student is admitted to classes until arrangements have been made with the Treasurer of the University for the settlement of fees.

Tuition per semester	\$625.00
General fee* per semester	93.50
Summer Session (per unit)	40.00

*General fees, in lieu of most special charges, include the following fees: Matriculation, Athletic, Medical, Library, Damage, Commencement, Diploma, and an average of the Laboratory and Materials fees. Expenses for field trips are not included.

Tuition and fees for a full semester program of 16 units amount to \$718.50. For a part program in the regular semesters, tuition and fees are computed at the rate of \$40.00 per unit plus \$5.00 fee for each course. Tuition and fees for course work in the Summer Session are computed at the rate of \$40.00 per unit. Federal traineeships are available for a selected number of qualified applicants.

Withdrawal from a Course or from the Graduate Program. Arrangements made with the Treasurer to prorate tuition and fees due do not imply that the full amount is not due and payable. A student who after 14 days after the date of registration withdraws from a course or from the Graduate School is liable for payment of full tuition fees and room rent.

Transcript. A student who wishes to transfer his credits from Duke University to another institution is entitled to one free transcript of his record. A fee of one dollar, payable in advance, is charged for each additional copy. Requests are directed to the Records Office.

Living Expenses

Housing. Graduate students in the School of Nursing may occupy rooms in the School of Nursing residence. The rental charge for a single room is \$405.00 per academic year. The rental charge for a double room is \$335.00 for each occupant per academic year. Rooms are rented for a period of not less than one semester unless special arrangements are made through the Housing Bureau after official acceptance for admission to the University.

Students may arrange for apartments or rooms in private homes in the city. The Housing Bureau of the University maintains a file of rooms and apartments listed with it for rental. Students may use this file as an aid to locating suitable living accommodations.

Food Services. Food service on both the Woman's College Campus and the West Campus is cafeteria style. The cost of meals approximates \$1.75 to \$2.25 per day, depending upon the need and taste of the individual. The dining facilities on the West Campus include three cafeterias with multiple-choice menus, a grill, and, in addition, the Oak Room where full meals and a la carte items are served. The Men's Graduate Center has a cafeteria open at meal hours, and a coffee lounge which is open until 11:00 p.m. The prices are the same as in the West Campus Union. Because of the large number of those served in the dining halls, it is not possible to arrange special diets for individual students.



Graduate Registration and Regulations

Registration

All students who enter course work for credit and all students who have completed minimum requirements for an advanced degree but continue to use the facilities of the University in their research must complete the registration procedures.

After the applicant has received notification of admission and has submitted a statement of acceptance of admission, she is eligible for registration. All students are expected to register at the time stated. Those registering later are subject to a late registration fee of five dollars.

Change of Registration. During the academic year within a period of fourteen days from the specified day of registration, students may change their schedules with the approval of the Director of the Graduate Program.

Academic Regulations

Course Requirements and Credits

Although ideally graduate study is principally individual reading,

research, and laboratory experimentation under guidance, academic progress in the United States is generally measured and recorded in terms of course hours and credits. Peculiar to graduate study is the term *residence*, also generally measured in hours, to designate individual study apart from courses, such as writing a thesis and preparing for general examinations. Since September, 1959, in this University, graduate credit for courses and seminars, research, and residence, and corresponding tuition and fees have been stated in terms of units. According to conventional measurement one unit is equivalent to one semester hour. Thus a course previously described as carrying a credit of 3 s.h. now carries a credit of 3 units.

Normally graduate students who do not carry teaching or assisting duties carry a full load of graduate work until the requirements of the degree are met.

Courses Primarily for Undergraduates. Students granted provisional admission may on occasion be required as part of their program to take undergraduate courses as prerequisites to continued graduate study. Undergraduate courses thus taken and others elected by the student will carry no graduate credit.

In exceptional cases, 100-level courses *outside the major department* may be taken for graduate credit to a maximum of two one-semester courses or one year course not exceeding a total of 8 units, when approved by the Director of the Graduate Program in the major department and in the department in which the course is listed.

Residence Requirements. Candidates for Master's degree must spend, as a minimum, one calendar year at Duke University. Often more time will prove necessary depending upon the nature of the student's program of studies.

Transfer of Graduate Credits. Under certain circumstances a maximum credit of 6 units may be allowed for graduate courses completed elsewhere. The acceptance of credit up to this amount, however, will not reduce the minimum period of full-time registered residence at Duke University.

Grading

Grades in the Graduate Program are as follows: *E*, *G*, *S*, *F*, and *I*. *E* (exceptional) is the highest mark. *G* (good) and *S* (satisfactory) are the remaining passing marks. *F* (failing) is below passing, and *I* (incomplete) indicates that some portion of the student's work is lacking, for a satisfactory reason, at the time the grades are reported. The instructor who gives an *I* for a course specifies the date by which the student must have made up the deficiency. In no case may an extension be granted beyond one calendar year from the date the course ended. If the course is not completed, a statement of *No Credit* is made upon the student's record.

Time Limits for Completion of Master's Degrees

The candidate for the Master's degree who is in residence for consecutive academic years should complete all requirements for the degree within two calendar years from the date of her first registration in the Graduate Program. Any candidate must complete all requirements within six calendar years of her first registration.

Credits earned over a longer period of time cannot be credited toward a degree.

In her graduate work the student must present satisfactory achievement for a minimum of 38 units of graduate credit. Nine of these units are earned outside of the major (Nursing) and are selected with the approval of the major professor from the course offerings in the natural and social sciences which correlate with her program of study in Nursing.

Withdrawal and Interruption of Program

From a course. After 14 days from the date of registration students may drop courses only with the approval of the Director of the Graduate Program, the instructor of the course to be dropped, and the Dean of the School of Nursing. If the course is dropped without the necessary approval, the permanent record will list the course as *Dropped Unofficially, F*. If a course is dropped 30 days or more after the beginning of the class for the semester involved, the status of the student at the time of withdrawal from the course will be determined and be indicated by the designation *Withdrew Passing (W.P.)* or *Withdrew Failing (W.F.)*.

From the School. The University reserves the right, and matriculation by the student is a concession of this right, to ask the withdrawal of any student whose conduct at any time is not satisfactory to the University, even though no specific charge be made against the student. If a student wishes for any reason to withdraw from the School she should notify both the Director of the Graduate Program and the Dean of the School prior to the date of her expected withdrawal.

Students who find it necessary to interrupt their program of study for a period longer than a summer vacation should, before departure, provide in writing a statement of the reason for interruption, mailing address, and expected date of return.

Nonacademic Regulations

Motor Vehicles

Every motor vehicle operated on the campus by students enrolled in Duke University must be registered at 08 Social Science within five days



after arrival and thereafter must display the proper decal emblem. To register a vehicle, the student should present the following documents: (1) state vehicle registration, (2) state operator's license, (3) evidence of automobile liability insurance as required by North Carolina law (\$5,000 per person, \$10,000 per accident for personal injuries; \$5,000 for property damage).

Graduate Courses of Instruction

School of Nursing Courses

N 250-251. *Human Behavior and Psychophysiology.* Presents the current theory of psychophysiology with the aim to develop deepened appreciation of the personality-illness relationship and of the influence of psychological factors in the genesis of somatic reactions and of somatic disease. (4 Units) *Reckless*

N 261-262. *Development of Nursing Theory.* Concerned with an explanation of bases for nursing practice (Intuition, Imitation, Emperic). An overview of scientific practices as related to the nursing process. Examination of techniques of theory construction. Individuals develop hypothesis and test such in clinical settings as an introduction to the development of nursing theory. First semester concentrated on theory construction. Second semester, the testing of hypothesis in clinical laboratories. (6 Units) *Professor Stone and Faculty*

N 265. *Methods of Research in Nursing.* An overview of research in nursing. Exploration of nature of research process. (3 Units) *Stone*

N 269. *Thesis Research.* Development of a research in nursing under direction of the faculty. (3 Units)

N 290. *Biostatistics.* The basic elements of statistical inference with specific emphasis on problems in medical and biological fields. Designed



to provide an introduction to some of the methods of modern statistical analysis and their use in making inferences from data collected in surveys and in the laboratory. Topics will include: probability and probability distributions, confidence interval estimation and hypothesis testing including some elementary distribution-free techniques, analysis of variance, correlation and regression and a brief introduction to the use of the computer in data storage, retrieval and analysis. Prerequisite: permission of instructor. 3 s.h. O'Fallon

N 311. Seminar in Selected Problems. (2 Units)

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The Summer Session of 1966 will include two terms: Term I, June 13 to July 17; Term II, July 20 to August 24. By attending both terms it is possible for a student to earn as many as twelve semester hours of credit.

While the basic purpose of the Summer Session is to serve the academic and the professional requirements of those who are interested in their own educational advancement, the University recognizes the need of, and provides for, a varied recreation program both athletic and social.

University fees for Summer Session 1966 will be charged at the rate of \$40.00 per semester hour for those admitted with advanced standing. Board for resident students is charged at the rate of \$85.00 for each term of Summer Session, room is \$55.50 per person for a term of Summer Session. The cost of laundry is approximately \$.50 per week. A bill is sent to all pre-registered students to permit payment in advance.



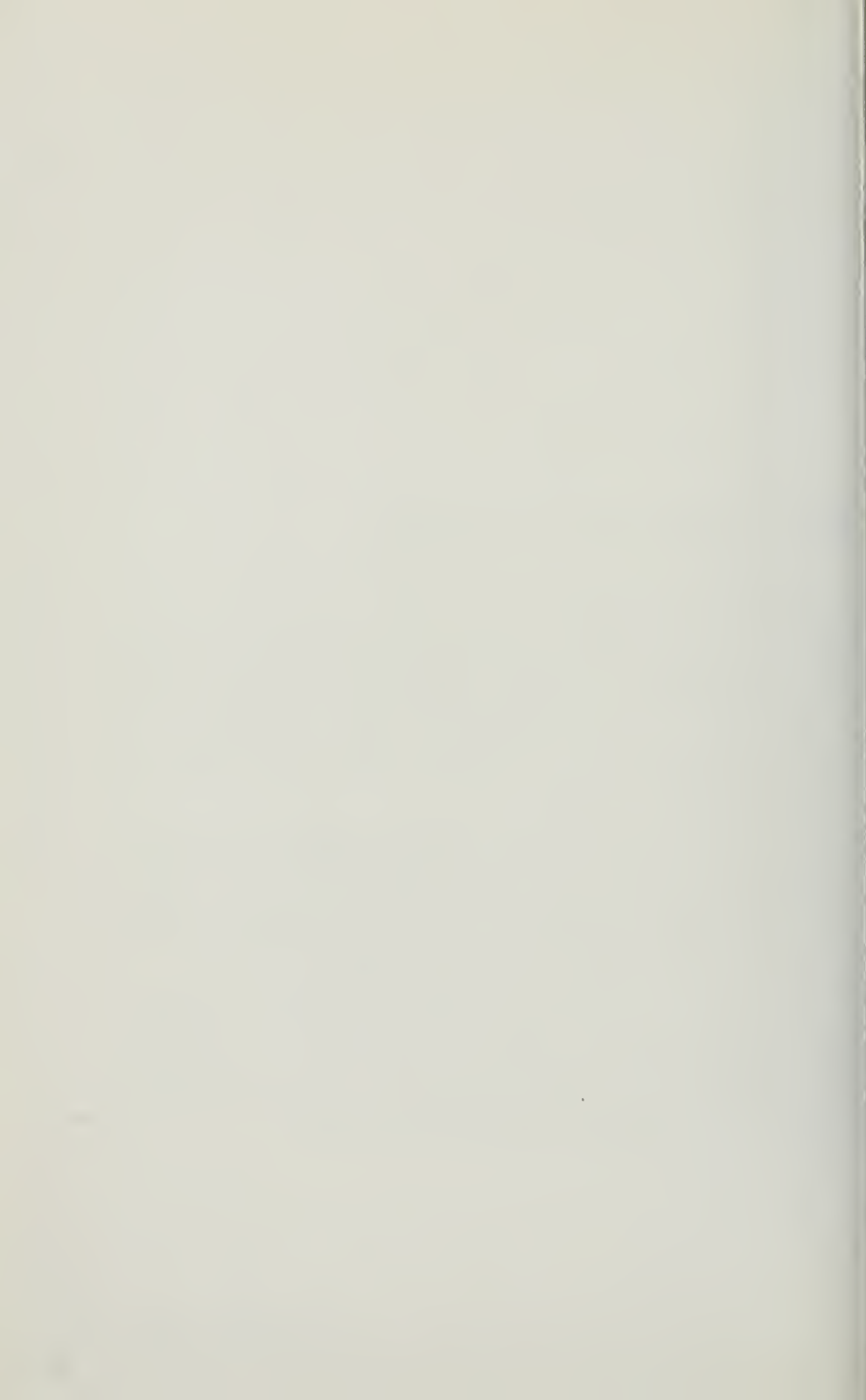
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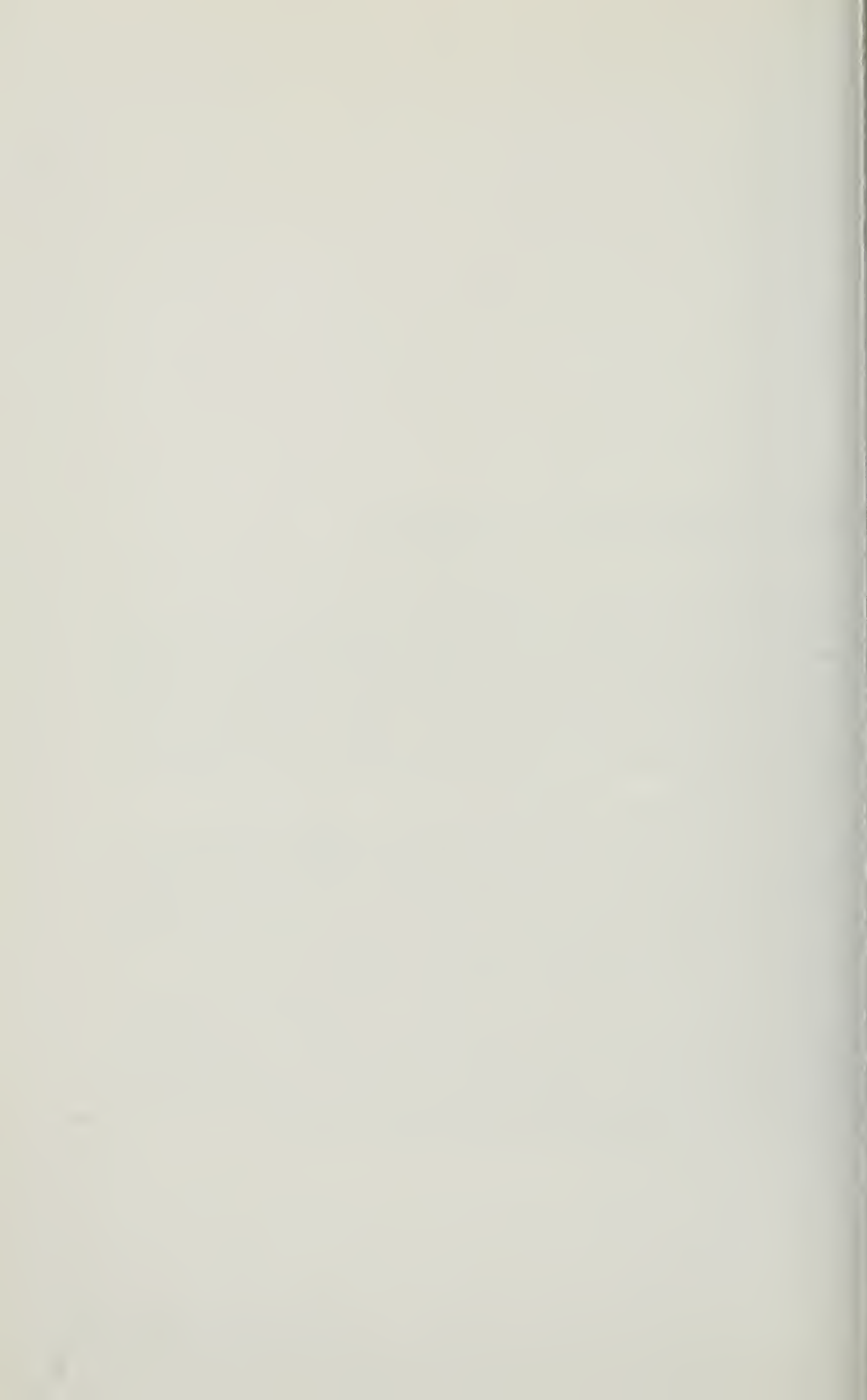
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Summer Session

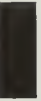


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The Summer Session

The Summer Session at Duke University makes available to Duke students, to students from other universities and colleges, to teachers in elementary and secondary schools, and to other special students a notable program of instruction in many fields of knowledge, both academic and professional.

Course programs offered during the summer are designed to meet special and particular needs as well as the more conventional requirements leading to specific degrees.

Postdoctoral research scholars may find the regular Summer Session courses useful for further study. The library facilities and the various laboratories may be of value for postdoctoral residents.

Graduate students who have been admitted to the Graduate School to study for the Master of Arts, Master of Education, and Master of Arts in Teaching degrees will find courses arranged in sequence from summer to summer to meet their requirements.

Teachers from elementary and secondary schools who desire to earn credits toward the renewal of their certificates and who are interested in further teacher training in subject content and method may enroll in senior-graduate courses as special or unclassified students.

Undergraduates of Duke University who desire to accelerate their programs may complete the work for a degree in three years by attending two or more Summer Sessions.

Undergraduates from other colleges and universities may enjoy the

special advantages of summer instruction at Duke and transfer earned credits to their own institutions.

Graduates of accredited high schools, both men and women, who have been admitted to the freshmen class of Duke University may begin their work in the Summer Session.

While the summer course program meets in many departments the needs of degree candidates, it goes beyond these limits in presenting also courses of wide general interest and, in addition, special non-credit lectures, conferences, institutes, and workshops.

Duke University's ample and modern research facilities will be available during the summer to all properly qualified students. It is the hope of the University, of the summer faculty, and of the administrative officers that former students and new students will find increasing values in each summer spent at Duke.

Courses of Study and Requirements for Degrees

Undergraduate Study

Students in the undergraduate colleges of Duke University who desire to enrich or accelerate their academic programs will find the summer offerings of interest. Special courses are provided which are not otherwise available to undergraduates; election of the usual course offerings may relieve an overload during the fall or spring terms. Summer programs enable some students to attain provisional graduate status in the senior year or to graduate early.

By attending one or both terms of the Summer Session it is possible for a student to elect as many as four courses and earn up to 12 s.h. credit. Instruction will be offered in the Summer of 1966 in most departments and colleges. Specific requirements for degrees offered in the undergraduate colleges may be obtained from the regular *Bulletin* of Undergraduate Instruction.

School of Nursing

The programs of the School of Nursing include courses in the Summer Session. Persons desiring to enroll in courses to meet the requirements of

the School of Nursing programs must be regularly enrolled students. Students who have been admitted with Advanced Standing and who may wish to make up deficiencies in the Summer Session must have courses approved by the School of Nursing. Information about required courses is published in the regular *Bulletin* of the School of Nursing. For further information write to the Dean of the School of Nursing, Hanes House, Duke University, Durham, North Carolina.

Divinity School Studies

The degrees of Bachelor of Divinity, Master of Theology, and Master of Religious Education are administered by the faculty of the Divinity School. A limited number of courses carrying credits toward these degrees is listed in this *Bulletin* under the heading of Religion. Persons desiring credit toward one of these degrees must be regularly admitted to the Divinity School, and all courses listed for Divinity School credit must be registered and approved in the office of the Divinity School. Students should consult the *Bulletin* of the Divinity School for specific requirements for the various degrees offered. This school publishes its own Summer Session *Bulletin*, a copy of which may be secured by addressing The Office of the Dean, The Divinity School, Duke Station, Durham, North Carolina.

Graduate Study

Summer Sessions offer an excellent opportunity to advance or complete programs of graduate study already undertaken, to begin study toward a graduate degree at Duke University, to acquire graduate training useful in professional advancement, or to study for personal satisfaction. The several departments offer a variety of graduate courses, as listed in later pages, given by members of the Duke faculty and visiting professors. Especially full programs are provided in Botany, Education, English, History, Psychology, Sociology, and Zoology.

Postdoctoral Research

Scholars engaged in postdoctoral research find it advantageous and sometimes essential to use in summer the resources of the Duke University libraries. The University welcomes these visitors and makes available to them the living accommodations of the dormitories and the dining halls during the Summer Session, June 13 to August 24.

The Ph.D. and Ed.D. Degrees

Study for the Ph.D. Degree. Students who are interested in working toward a Ph.D. degree should note in detail the requirements as outlined in the *Bulletin* of the Graduate School of Arts and Sciences. Requirements for the Ph.D. include one academic year of full-time residence.

Study for the Ed.D. Degree. Students who are interested in working toward the Ed.D. degree or for advanced certificates for principals and supervisors should consult the detailed statement in the *Bulletin* of the Graduate School of Arts and Sciences. Requests for specific information regarding residence and programs for the Ed.D. degree should be sent to the Director of Graduate Studies, Department of Education.

The Master's Degree

Candidacy. As a candidate for a Master's degree (A.M., M.S., M.Ed., M.A.T., M.H.A.) the graduate student must (1) have made passing grades in all courses taken during the first period of residence (if he registers for fewer than 12 units of graduate courses during the first period of residence, he must make passing grades on the initial 12 units of graduate courses), (2) have made a grade of "G" or "E" on at least 3 units of this work, and (3) have received the approval of the major department (or in the case of the M.A.T. of the supervisory committee).

Time Limits for Candidates. A candidate for a Master's degree who is in residence for consecutive academic years should complete all requirements for the degree within two calendar years from the date of his first registration in the Graduate School. Any candidate must complete all requirements within six calendar years of his first registration.

Requirements for Master of Arts Degree

Language Requirements. The candidate for the A.M. degree must have a reading knowledge of at least one foreign language. (The several departments reserve the right to specify which foreign languages are acceptable.) The language requirement is met by successfully passing examinations as follows:

a. For French, German, and Russian students admitted in September, 1964 and thereafter take the Educational Testing Service examination given at the Duke University Counseling Center and elsewhere. Students who were admitted before September, 1964 may take either these examinations or the regular reading examination offered by the respective departments.

b. For Spanish the department reading examinations will be taken by all students.

c. For other languages, special examinations must be requested.

Major and Minor Subjects. As a prerequisite to graduate study in his major subject, the student must have completed a *minimum* of 12 semester hours of approved college courses in that subject, and 12 additional semester hours in that subject or in related work. Since some departments have specific requirements for undergraduate preparation, the student should read carefully the special requirements listed by his major department, which are included as headnotes to the course offerings in the *Bulletin* of the Graduate School.

To complete the course requirements for the A.M. degree, the student must take 24 units of graduate courses, of which at least 12 must be in the major subject. Of the remaining 12 he must take 6 units of course work in a minor subject, leaving 6 units of course work to be taken in either the major or minor field, or in another field approved by the major departments and the Dean of the Graduate School. In addition to the course work, the student must present a thesis which carries a credit of 6 units. Thus, the total credit required for the A.M. degree amounts to 30 units.

The Thesis for the Master of Arts Degree. The thesis for the A.M. degree should demonstrate the student's ability to collect, arrange, interpret or report pertinent material on his special research problem. Although a publishable document is not required, the thesis must be written in a literate style, and should exhibit the student's competence in scholarly methods and procedures.

Regulations and Procedures. Students expecting to complete all requirements for a Master's degree should file with the Graduate School office *not less than one month* prior to first presentation of the thesis a declaration of intention to receive the degree and a thesis title. Candidates completing requirements for a Master's degree without thesis should file the same official blank *one month* prior to completion of all degree requirements. Official blanks may be obtained from the Graduate Office or from the Director of Graduate Studies in the student's major department.

Four typewritten copies of the thesis, in the spring binders provided by the Duke University Library, must be submitted, in approved form to the Dean of the Graduate School at least *three days* before the date of the thesis examination. The copies will then be distributed to the several members of the examining committee.

The Examining Committee and the Examination. After consultation with the professor who has directed the thesis work, the Director of Graduate Studies in the major department appoints an examining committee composed of the director of the thesis as chairman and two other members of the graduate faculty, one of whom should represent the

minor department. The committee composition is subject to approval by the Dean of the Graduate School. The candidate appears before this committee for an examination, which lasts for about one and one-half hours. The subject matter covered in the examination is usually restricted to the thesis and to the major field.

If the candidate passes his examination, the examining committee certifies to this fact by signing the title page of the ribbon copy and first carbon copy of the thesis. The candidate then returns the original and first carbon copy of the thesis to the Dean of the Graduate School for binding and deposit in the University Library. The binding fee is \$5.00 a volume.

Requirements for the Master of Education Degree

Prerequisites. The degree of Master of Education is granted ordinarily only to teachers or to others engaged in educational work.

Before a student is admitted to graduate study for this degree, he should have completed, on the undergraduate level, a minimum of 18 semester hours of approved work in Education.

Requirements for the Degree Without Thesis. The required work includes a departmental major (Elementary Education, Administration, Counseling, Secondary Education or Teaching the Emotionally Disturbed) of at least 12 units, and a minor of at least 6 units outside the Department of Education. The remaining 12 units are elective within the area of Education and the minor field, but require the approval of the student's major adviser and the Director of Graduate Studies.

Toward the end of his residence the student must pass a comprehensive examination on his departmental major. Permission to take such examination must be obtained from the Director of Graduate Studies of the Department of Education, and a notice of intention must be filed with him *at least two weeks* before the announced dates of the examination.

Requirements for the Degree With Thesis. Students who elect this plan are permitted to substitute a thesis for 6 units of the required course work. The thesis subject must be approved by the professor who is to direct it and by the Director of Graduate Studies. Students expecting to complete all requirements for a Master of Education degree should file with the Graduate School Office *not less than one month* prior to first presentation of the thesis a declaration of intention to receive the degree and a thesis title. Official blanks may be obtained from the Graduate Office or from the Director of Graduate Studies in the Department of Education.

In addition to the thesis, the student must present at least 24 units of course credit. Of these, 12 units must be taken in the student's departmental major. Six units, constituting a minor, must be taken outside the Department of Education. The remaining 6 units are elective within the

area of Education and the minor field, but require the approval of the student's major adviser and the Director of Graduate Studies.

The regulations concerning the writing and submission of the thesis, and the examination of it, are the same as those governing the thesis for the Master of Arts degree.

The Master of Arts in Teaching Degree

Prerequisites. The degree of Master of Arts in Teaching is designed for teachers already in service and for recent graduates of liberal arts colleges who wish to enter public school teaching.

A student should normally have completed a minimum of 12 semester hours in his proposed major subject and an additional 12 semester hours in that or related subjects. In the event that a student wishes to undertake a graduate major different from the undergraduate major, the prerequisites may be modified upon the recommendation of the student's committee and the approval of the Dean of the Graduate School.

Programs for the Degree. One of two programs may be arranged, in consultation with the student's committee:

- a. A major in Education of 18 to 24 units and 6 to 12 units in courses outside the Department of Education.
- b. A major in a department other than Education of 18 to 24 units and 6 to 12 units in Education.

In both programs a minimum of 30 units is required.

The courses outside the Department of Education are to be taken in one or more subjects ordinarily taught in the secondary schools. The amount and distribution of this work will be determined by the needs of the individual student.

The Master of Arts in Teaching may be earned with or without the presentation of a thesis. If a student, in consultation with his committee, elects to present a thesis, 6 units of the total of 30 units required will be allotted to thesis research. He will then be required to complete 24 units of course credits. The regulations concerning the writing and submission of the thesis, and the examination on it, are the same as those governing the thesis for the Master of Arts degree.

Candidates for the Master of Arts in Teaching who have not had teaching experience must major in Education and are required to take Education 215 (or 315) and 216, in which case a minimum of 36 units is required.

The Committee. Each candidate for the degree will be assigned a committee, appointed by the Director of Graduate Studies in his major department, to plan his program of study.

This committee will consist of three members, at least one of whom will be from the Department of Education, and at least one from another

department. The chairman of the committee will normally be chosen from the department of the major.

Cooperative Program in Teacher Education. Thirty-five to forty selected graduates of liberal arts colleges who desire to prepare for high-school teaching will be admitted to a special internship program at Duke University. This program is designed to prepare for a teaching career selected college graduates who did not prepare professionally for teacher certification as undergraduates. The Cooperative Program provides, for candidates who are chosen, graduate study in their special fields, professional courses, and carefully supervised observation and teaching experience. One who completes the program successfully can achieve within a period of fifteen months a year of teaching experience, a Master of Arts in Teaching degree, and full certification as a teacher.

Candidates will begin the program at the opening of the Summer Session of 1966 and complete it in August of 1967. They will spend the summer preceding and the summer following the year of teaching in residence at the University. During the school year 1966-1967 interns will be employed as regular teachers in a cooperating public school system. During this year they will receive full salary and will work under the joint supervision of the cooperating public school and the University. The program will meet training qualifications for the advanced, or graduate, teacher's certificate in many states. Participants in the program are expected to teach for a second year as fully certified teachers in the school in which they complete the internship.

The salary for the year of teaching will, in effect, constitute a substantial award to candidates selected for the program. Interns will benefit from Duke University's special tuition rate for teachers. Applicants will be considered, as are candidates for other awards, on a competitive basis. The best-qualified applicants will be chosen on the basis of undergraduate record, recommendations, and evidence of interest in becoming high-school teachers. Applicants are required to arrange interviews in connection with their applications. Application forms may be secured by addressing a request to the Dean of the Graduate School and should be submitted before February 15, 1966. Details concerning the program can be obtained by writing the Director, Cooperative Program in Teacher Education, Department of Education, Duke University.

Requirements for the Master of Science Degree

Prerequisites. The degree of Master of Science is offered in the fields of Civil, Electrical, and Mechanical Engineering. As prerequisites to this degree the student must have earned a Bachelor's degree from an accredited engineering college and have completed a minimum of 12 semester hours' work in the major field.

Foreign Language. There is no foreign language requirement for this degree.

Major and Minor Subjects. The work for the Master of Science degree is designed to provide a broad basic foundation in the science of Civil, Electrical, or Mechanical Engineering. The student must present acceptable grades for a minimum of 24 units of graduate courses. Of these, at least 12 units must be in the major area. He must also take a minimum of 6 units of minor work outside of engineering and 6 units in the major, minor, or another approved area. In addition to these he must present a thesis, which carries a credit of 6 units. Thus his earned credit for the degree totals a minimum of 30 units.

Regulations and Procedures. The regulations and procedures and the provisions for examination and an examining committee are the same as those for the Master of Arts degree.

Cooperative Programs, Special Conferences and Courses

Cooperative Programs

The long-standing reciprocal agreement with the Consolidated University of North Carolina (see Graduate School *Bulletin*) is now effective during the respective Summer Sessions of this University and the University of North Carolina. It is restricted to a graduate student who has registered for a full program during at least one semester of the preceding academic year. Such a student by enrolling in the home Summer Session and paying its normal fees may register for a maximum of 3 semester hours at the other institution upon payment of a nominal fee of \$2.00. Credit so earned is not defined as transfer credit.

Special Conferences and Courses

Duke Study Abroad

Duke University in cooperation with the Experiment in International Living offers summer-school work abroad in Strasbourg, France; Munster, Germany; and Santiago de Compestela, Spain. Any qualified Duke student can earn a 6 to 8 hours' credit by participation in one of these

programs. Courses are offered in the language and literature of the country concerned as well as courses in history and contemporary institutions. Students may also engage in independent study planned in advance in consultation with the director of undergraduate studies of his major department. Any Duke student who has completed at least one college year in the language of the country concerned is eligible.

Applications must be submitted not later than February 1st for the following summer's program. For further information and application blanks apply to Dr. Neal Dow, Director of Study Abroad, Box 7204 College Station, Durham, N. C. or Carr Building 214.

Special Programs for Teachers of Science and Mathematics

It is anticipated that the Summer Session will offer a number of special programs at the graduate level designed specifically for high-school teachers of science and mathematics. For detailed information on the programs, teachers should write Dr. Thomas Reynolds, Mathematics Department, Duke University, Durham, North Carolina.

Conference on School Law

A conference on school law will be held on Duke University campus on June 21-22. The program is planned for the benefit of administrators and teachers in schools and colleges. Speakers and consultants well known in the field of school law will participate in the two-day conference.

Conference on Elementary Education, June 16-17

The twelfth of a series of conferences dealing with various areas of learning in the elementary school will be devoted to arithmetic. The program of work will be under the general direction of Dr. Olan L. Petty, Department of Education, Duke University.

The general theme of the conference will be improvement of instruction in arithmetic in the elementary school. Emphasis will be placed on methods, materials, and activities necessary for an effective program in this subject. Special attention will be given to topics of contemporary mathematics programs for the elementary school. The program of the conference will feature a national authority in the field of contemporary mathematics for the elementary school.

Modern Mathematics Workshop for Elementary Teachers

The Duke University Summer Session with the cooperation of the North Carolina State Department of Public Instruction will offer a two-

week workshop in modern mathematics for elementary teachers, June 20 to July 1.

The workshop will be instructional with emphasis on various topics of the content presently being stressed in the contemporary mathematics programs in the elementary grades. Participants in the workshop will be granted 2 s.h. credit for the workshop.

Registration fee for the workshop is \$40.00 for public school teachers. There are *fifteen* \$40.00 scholarships available for North Carolina public elementary teachers. For further information and application write to the Director of the Summer Session, Duke University, Durham, North Carolina.

NDEA Summer Institute in English

The Department of English will offer during Term I (June 13-July 16) an NDEA Institute for Teachers of English in the secondary schools. The Institute will include instruction in Literature, Language, and Composition, following the general plan of the Institute offered in the Summer of 1962 in conjunction with the Commission on English of the College Entrance Examination Board. The syllabi prepared under the supervision of the Commission on English will be employed. The instruction will carry credit which may be applied to the renewal of a teaching certificate. The Institute will be limited to about 45 teachers, whose teaching assignments are chiefly in the eleventh and twelfth grades; in selection of participants, special preference will be given to teachers from North Carolina, South Carolina, and Virginia, but teachers east of the Mississippi River are eligible. The deadline will be March 21, 1966. For application blanks and further information write: Director, Summer Institute, English Department, Duke University, Durham, North Carolina.

NDEA Institute in History

Duke University will conduct an Institute in Modern European History (since 1789) from June 25 to August 6, 1966. The Institute will be entirely separate from the regular summer school curriculum and will enroll forty junior and senior high-school teachers involved in the teaching of the Social Studies. Teachers selected will be paid \$75 (and \$15 for each dependent) for each week the Institute is in session. Further information and application may be obtained by writing to NDEA Institute in History, Box 6727, Duke University, Durham, North Carolina. Applications should be *postmarked* no later than March 21, 1966.

Southeastern Institute of Medieval and Renaissance Studies

The Southeastern Institute of Medieval and Renaissance Studies has been established for the advancement of scholarship and the improvement

of teaching in the southeastern region. Through the Institute the resources of Duke University and the University of North Carolina—particularly library holdings—will be made available to scholars and teachers throughout the region. Students of all areas of medieval and renaissance studies will participate. The Institute will alternate annually between the campuses of Duke University and the University of North Carolina at Chapel Hill. The second session from July 20 to August 24, 1966, will be held on the Duke University campus.

Highlands Biological Station

Duke University holds a subscribing instructional membership in the Highlands Biological Station at Highlands, North Carolina, on the southern edge of the Blue Ridge Mountains at an elevation of 4,118 feet. The situation and the region offer an excellent opportunity for field studies and limited laboratory work. A limited number of qualified students in Botany and Zoology may make arrangements to carry out research at this station.

Medical Mycology

A month's course in Medical Mycology, under the direction of Dr. Norman F. Conant, is to be offered at Duke University School of Medicine and Duke Hospital, July 5 to July 31, 1966. The course will be offered every day in the week, except Sunday, and has been designed to insure a working knowledge of the human pathogenic fungi within the time allotted.

Emphasis will be placed on the practical aspects of the laboratory as an aid in helping establish a diagnosis of fungus infection. Insofar as possible and as patients become available, methods of collecting materials in the clinic for study and culture will be stressed. Work with patients, clinical material, cultures, and laboratory animals will serve as a basis for this course. Also, an opportunity to study pathologic material, gross and microscopic, will be given those whose previous training would allow them to obtain the greatest benefit from a study of such material.

The enrollment for the course will be limited and the applications will be considered in the order in which they are received. An attempt will be made, however, to select students on the basis of their previous training and their stated need for this type of work.

A fee of \$100.00 will be charged for this course, upon the completion of which a suitable certificate will be awarded. Please direct inquiries to Dr. Norman F. Conant, Professor of Microbiology, Duke University School of Medicine, Durham, North Carolina.

The Methodist Course of Study School

The eighteenth session of the short-term school for Methodist ministers taking the required Course of Study will be conducted during the period, July 11-August 5, 1966. While this School is designed primarily for Supply Pastors and other non-seminary candidates for the Methodist ministry, clergymen of any denomination may enroll. The curriculum as approved by the 1964 Methodist General Conference will be followed, which will include Studies for License to Preach, Introductory Studies and the Studies for the First, Second, Third, and Fourth Years.

In addition to class work, there is provision for daily worship and a number of special lectures and workshops. A varied program of recreation and athletics will be supervised by the University Department of Physical Education.

Registration is scheduled for July 11. Classes begin on the morning of July 12 and continue through August 5. A descriptive folder giving details of the School will be ready for distribution about March 1, 1966, and copies may be procured by writing to Professor W. A. Kale, Director, Box 4353, Duke Station, Durham, N. C.

Divinity School Summer Clinics

Three clinics, Preaching, Pastoral Care, and Church Planning and Development will be held simultaneously, July 18-29, 1966. Registration is open to ministers of all denominations. No academic credit is given. Please address requests for information, costs and financial aid to Box 4814, Duke Station, Durham, N. C.

Preaching. The Clinic in Preaching will focus on principal and practical aspects of sermon planning, preparation, and presentation, particularly in the area of sermon construction and delivery. Ample opportunity is provided for the participants to preach before a small group for critique. Matters of common concern for preachers are discussed in plenary sessions. Registration is limited to eighteen members, preferably active ministers and chaplains who have been out of seminary five years or more. The leader of the Clinic this year is Dr. James T. Cleland, Dean of the Chapel and James B. Duke Professor of Preaching at Duke. For further information write to Professor Thor Hall, Director.

Pastoral Care. The Clinic in Pastoral Care has as its theme the psychological and theological dimensions of selfhood. Through lectures, discussions, hospital visitation, and verbatim conferences, aspects of the theme are explored: the meaning of selfhood, the self in crisis and the ministry of the Church to those caught in the crisis of illness, the action of God in the midst of suffering, and the personal and sacramental means of grace. Hospital visitation supervised by the Chaplains to the Duke Medical Center forms an integral part of the program. For registration and information write to Professor Richard A. Goodling, Director.

Church Planning and Development. The purpose is to acquaint church leaders with the rationale and methodology of the "planning process," applying it to such church situations as church extension, conference structure, parish planning and programming, research-survey, and co-operative work both in urban and rural settings. For registration and information write to Professor Daniel M. Schores, Director.

Resources for Study

Libraries

The University Libraries, with 1,716,855 volumes and 3,800,000 manuscripts, provide exceptional resources and facilities for study and research by undergraduate and graduate students and visiting scholars. About 70,000 volumes are added annually, while 120 foreign and domestic newspapers and 7,500 periodicals are received currently. There is also a large collection of microfilms of rare books, newspapers, and periodicals. Study facilities are provided for 269 graduate students in air-conditioned stacks of the General Library.

All libraries of the University are open for use throughout the summer. A "Student's Guide to the General Library," and a brochure on "The Library of Duke University" which describes the building and collections in general detail are available on request addressed to the Librarian of the University.

Laboratories

The laboratories in the various Science Departments (Botany, Chemistry, Physics, Psychology, and Zoology) are designed for both teaching and research. Ideal locations for special work in some of the sciences are available at Duke University Marine Laboratory at Beaufort, North Carolina; at Highlands Biological Laboratory at Highlands, North Carolina; in the Duke Forest at Durham, North Carolina; and in the Sarah P. Duke Gardens on the West Campus of Duke University.

Student Life

Living Accommodations

Residence Hall Accommodations

The residence hall facilities of Duke University will be available to Summer Session students. The Men's Graduate Center will be used for graduate and professional men students enrolled in the Summer Sessions; however, the Men's Graduate Center dining hall will not serve meals during the Summer Session. Graduate and undergraduate women reside in residence halls on West Campus during the Summer Session.

The Duke University Apartments will be available to married graduate students enrolled in the Summer Session. Information concerning Duke University Apartments will be supplied by the Director of Housing upon receipt of your request.

Undergraduates, both men and women, are required to live in the residence halls unless they are married or living with parents or relatives. Any exception must be approved in advance by the Dean of Undergraduate Women or the Dean of Undergraduate Men as the case may be.

The majority of the rooms are double rooms furnished for two persons. A limited number of rooms are single and are furnished for one person and are assigned in the order of receipt of application in the Housing Bureau. The Housing Bureau will convert a double room to a double/single and furnish it for occupancy by one person. Furniture consists of

single bed with mattress, clothes closet, a chest of drawers for each person, a study table, chairs, bookcase, wastebasket, and window shades. Linens, blankets, towels, pillows and desk lamps are not furnished by the University.

Summer Session students who will be in residence for both summer terms must so indicate on the Summer Session Housing Application and pay for both terms in advance. Those applicants who apply for only one term or fail to pay rent in advance for both terms at the time of application may be requested to move to another house for the second term.

The Duke University Marine Laboratory, located on Pivers Island adjoining the United States Bureau of Fisheries across the Newport River from Beaufort, North Carolina, has cottage-type residence halls which will be available for Summer Session students. All rooms in the Marine Laboratory residence halls are equipped for two persons. There is a separate building for dining and social activity. Rates for these rooms are the same as shown below. It is not anticipated that there will be any double rooms furnished as single rooms for the Summer Session. Reservations for rooms at the Marine Laboratory, Beaufort, should be made with the Business Manager, Duke University Marine Laboratory, Beaufort, North Carolina, by submitting a Summer Session residence hall application with your personal check for the amount of your room rent.

Dining Service

Food service is cafeteria style. The cost of meals run from \$1.75 to \$2.00 per day, depending on the need and taste of the individual. Only the dining facilities on the West Campus will be used for the regular Summer Session students. The cafeteria in the Men's Graduate Center is usually not open in the summer.

University Services

Medical Care

The Student Health Service, in the Duke Medical School Building operates during the Summer Session and offers exactly the same medical and surgical services available to each full-time student during the academic year, as described completely in the Undergraduate *Bulletin*, but covers only *six days* of hospitalization in each term of Summer Session residence.

With the exceptions noted below, this service, under the direction of the University Physician, and with the cooperation of the staff of Duke Hospital, furnishes full medical and surgical care, drugs, dressings, x-ray work, and ward, but not special nursing, for any acute

illness or injury, at no additional cost beyond the University fee for each term of residence or any shorter period. The cost of braces and necessary orthopedic appliances and of blood, as well as special nursing, must be borne by the student. A charge for meals (\$1.80 per day) will be made while the student is in the Hospital. All necessary telephone and telegraph charges will be borne by the student. If students have insurance providing hospitalization, surgical or medical benefits, these benefits shall be applied to the cost of their medical care. Refraction of eyes, treatment of teeth, and of all chronic and pre-existing conditions such as diseased tonsils, hernias, elective surgery, chronic skin conditions, endocrine disturbances, etc., or accidents or illness occurring during vacation or while off the campus are not included in this service.

No illness is treated in dormitory or other rooms occupied by students. Students needing treatment for minor medical or surgical conditions have the facilities of the Student Health Office in the Hospital between 9:00 a.m. and 5:30 p.m. on week-days. Emergency room care is available at night and on Saturday afternoons and Sundays. For admission to the Hospital, or for x-ray and consultation services, a student *must* present the 1966 Summer Session Student Identification Card as evidence that he is matriculated in the Summer Session and entitled to hospitalization. Students who register for less than 3 semester hours' credit are not entitled to medical care without charge.

Appointments Office

The Appointments Office is maintained in Page Building the year around. The services of this Office are available without charge to students and teachers registered for a degree in Duke University and to school officials who may be seeking the services of new teachers. Students interested in securing employment through the Appointments Office should register with this Office.

The University Counseling Center

The University maintains a University Counseling Center which provides a centralized program of educational, vocational, and personal counseling for students. This confidential counseling service on problems of personal, social, educational, and vocational adjustment is provided without cost to students enrolled at the University. In addition, the Center administers special group testing programs for University schools and departments and serves as the local testing center for a wide variety of national testing programs. The Center also carries on programs of research in the field of measurement and counseling. Although the counseling, testing, and research services of the Center are designed primarily to meet the needs of the students, the faculty, and the staff of Duke University, these services are made available to individuals and

organizations outside the University as its facilities permit. Requests for further information should be addressed to the Director, University Counseling Center, Duke Station, Durham, North Carolina.

Student Activities

Religious Life

The Chapel, home of Duke University Church, interdenominational, is open all summer. The Church encourages the cultivation of the spiritual and moral life of students through participation in the service of worship which is held each Sunday morning at nine-thirty o'clock. The pulpit is occupied by a regular University preacher, or a special visiting preacher. Choral music for these services is provided by a volunteer student choir.

Recreation and Activities

The Summer Session will provide a varied program of entertainment and recreation. These plans include movies, presented once weekly by Quadrangle Pictures, weekly summer dances and open house social evenings with games for those who do not care to dance. Tours to areas of interest can be arranged for week-ends. Both the mountains and the seashore are easily accessible. Adequate facilities are available for those interested in swimming, tennis, and other sports. State clubs organized for the summer play an active part in all social activities.

Publications

During the Summer Session the University will publish each Saturday *The Sundial*, an official calendar announcing events—academic, social and recreational—of the following week. This calendar also includes official notices concerning academic requirements. Students are expected therefore to read *The Sundial* regularly.

Admission and Registration

Admission

Students in the following categories may be admitted to the Duke University Summer Session:

1. Graduates and undergraduates who are presently enrolled and in good standing in Duke University.
2. Graduates and undergraduates who have been formally admitted, or re-admitted, to Duke University.
3. Students who are currently in good standing at their respective institution and who have approval by the proper authority to take and transfer credits earned in the Duke Summer Session.
4. Teachers in service with or without the Bachelor's degree who wish to earn credits for certification purposes.

Admission to specific courses offered in the Summer Session is governed by the student's academic status (freshman, sophomore, junior, senior, graduate, special or unclassified) and by the prerequisites of the course in question.

Students in Residence at Duke University during the Spring Semester, 1966

A Duke University student, either graduate or undergraduate, who plans to attend the Summer Session should at the time of pre-registra-

tion for the fall semester (see p. 27 for specific dates) enroll for the desired Summer Session courses. He need *not* file with the Summer Session the application blank at the end of this *Bulletin*.

Students Not in Residence at Duke University during the Spring Semester, 1966

Undergraduates. New students seeking to enter Duke University as freshmen or as undergraduates with advanced standing, and undergraduates who wish to re-enter the University should write the Office of Admissions requesting application forms.

Undergraduates, both men and women, enrolled in other colleges and universities who desire to earn in the Duke University Summer Session credits which are to be transferred to their own institutions should apply directly to the Director of the Summer Session, Duke University, on the application form at the end of this *Bulletin*. They should give accurately and clearly all information called for on the application form.

Graduates. Students with graduate standing and teachers in service with or without the Bachelor's degree who wish to earn credits toward the renewal or the advancement of their certificate and who do not wish to become candidates for a degree at Duke University should apply to the Director of the Summer Session on the application form at the end of this *Bulletin*.

Graduate students who are seeking admission to the Graduate School of Arts and Sciences and those who have been admitted to the Graduate School must apply to the Director of the Summer Session on the application form at the end of this *Bulletin*. Those who are seeking admission to the Graduate School *must also file* Graduate School application forms which may be secured by writing to the Dean of the Graduate School, Duke University, Durham, North Carolina.

Students Not Seeking Admission to the Graduate School. Any student who holds an A.B. or B.S. degree and who does not intend to earn an advanced degree at Duke University but who desires graduate work for professional or other reasons should apply to the Director of the Summer Session for admission as an unclassified student. Credit earned by an unclassified student will serve all usual purposes except that it will not count toward an advanced degree at Duke University.

Students Seeking Admission to the Graduate School. Admission may be granted to a student who has received an A.B. or B.S. degree from an accredited institution after a four-year course of study. The undergraduate record should be well rounded and of such quality as to give evidence of real capacity for success in graduate study. A student who seeks admission should (1) secure an application blank from the Graduate School and promptly return it with the required information, (2) have mailed

directly from the registrar of each college he has attended to the Dean of the Graduate School at Duke University two copies of an official transcript of all his undergraduate or graduate work, (3) have mailed to the same official at least two, and preferably three, letters of recommendation from persons best qualified to appraise his capacity for graduate study. Special forms will be provided.

As additional evidence of capability scores on the Graduate Record Examination, particularly the Aptitude Test, and on the Miller Analogies Test are strongly recommended in all departments and must be submitted if either test has been taken. Scores on the Graduate Record Examination may be requested of any applicant whose record is marginal and must be submitted by all applicants for a fellowship. Departments that require scores of all applicants are listed below:

Graduate Record Examination

	<i>Aptitude Test</i>	<i>Advanced Test</i>	<i>Miller Analogies Test</i>	
Anatomy	×	×		
Botany	×	×		
Economics	×	×		
English	×	×		
Forestry	×			
Germanic Languages	×			
History	×			
Philosophy	×		×	
Physiology	×			
Psychology	×		×	
Romance Languages	×	×		
Zoology	×	×	×	

¹ Either GRE or MAT.

(Information on times and places of Graduate Record Examinations can be provided at the applicant's college or by the Educational Testing Service, 20 Nassau Street, Princeton, New Jersey.)

So that applications for admission to the Graduate School for summer work may be given full consideration, the student must submit all required documents to the Dean of the Graduate School at least ONE MONTH before the date of intended registration. No student may register with the Graduate School until his application has been completed and admission has been granted.

Postdoctoral Scholars

Application for these postdoctoral research privileges must be made in advance by letter to the Director of the Summer Session giving the applicant's present position, the specific field of his research interest and the dates during which he desires to be in residence. Approved

applicants will be accepted subject to the availability of library and of dormitory space.

Admission to Degree Candidacy

Credits earned during the Summer Session may be applied toward the requirements of a degree.

Undergraduates. A student seeking to enroll as a candidate for the Bachelor's degree from one of the colleges of Duke University must meet the entrance requirements set forth in the *Bulletin* of Undergraduate Instruction and be accepted by the Director of Admissions. This *Bulletin* may be secured by writing the Office of Admissions, Duke University.

Graduates. A student seeking to enroll as a candidate for one of the advanced degrees offered by the Graduate School of Arts and Sciences of Duke University must meet the requirements set forth in the Graduate School *Bulletin*. This *Bulletin* may be secured by writing to the Office of the Graduate School of Arts and Sciences.

Registration

Definition of Terms

Registration. A student has completed registration for the Summer Session when:

1. His course program has been written and approved by the dean of the school or college in which he is enrolled or by the Director of the Summer Session in the case of the special or unclassified student.
2. Summer Session forms have been completed properly by the student in the Summer Session Office.
3. Summer Session University fees have been paid. A place in a course cannot be assured until fees have been paid. Tuition bills are not sent to the student's home.

Pre-enrollment. The term pre-enrollment refers only to the writing of the course program and its approval by the proper authority or by the Director of the Summer Session in the case of the special or unclassified student. *Pre-enrollment alone does not constitute registration.*

General Registration

Classes Beginning June 14. All Summer Session students whose classes begin on June 14, Term I, who *do not* complete registration in the Summer Session Office, 119 Allen Building, on or before June 3 *must* present themselves at general registration in Central Records Office, 103 Allen Build-

ing, on June 13 to register. Students will register during 30-minute periods alphabetically according to *surname* as indicated in the following table.

<i>Time</i>	<i>Registrants (Surname)</i>
8:30— 9:00	A—B
9:00— 9:30	C—E
9:30—10:00	F—H
10:00—10:30	I—L
10:30—11:00	Mc—N
11:00—11:30	O—P
11:30—12:00	Q—R
12:00—12:30	S—T
12:30— 1:00	U—Z

Classes Beginning June 21. All Summer Session students whose classes begin on June 21, Term I, must complete registration in the Summer Session Office, 119 Allen Building, on or before June 20.

Classes Beginning July 21. All Summer Session students who wish to register for courses offered during Term II or for research during Term II may register in the Summer Session Office on July 5 through July 18. All students who *do not* register for second term during this period *must* register in Central Records Office, 103 Allen Building, on July 20, between 8:30 a.m. and 1:00 p.m.

Classes Beginning on Other Dates. All Summer Session students registering for courses beginning on dates other than those specified above must complete registration in the Summer Session Office *before* the date on which their classes begin. *Registration on the day on which classes are scheduled to begin will be considered late registration.*

Late Registration

Any student who fails to register on or before the dates specified in the preceding paragraphs will be charged a fee of \$5.00 for late registration. No student will be permitted to register for a 3 semester hour course after the third class day (June 16, Term I; July 23, Term II); a 4 semester hour course after the second class day (June 22, Term I; July 22, Term II). Changes in courses other than those required by the University will require a payment of \$1.00 for each change made. All changes must be approved by the dean of the school or college in which the student is enrolled or, in the case of the special or unclassified student, by the Director of the Summer Session. These registration rules are enforced rigidly.

Since Summer Session courses present a program of study in more concentrated and rapid form than in the regular semesters, students are advised to register on time and to be present at all class sessions.

Advance Registration

Students in Residence at Duke University during the Spring Semester, 1966

Writing Course Programs in the Schools and Colleges. Students in residence at Duke University during the Spring Semester, 1966; both graduate and undergraduate, who plan to enroll for courses offered in the 1966 Summer Session or to carry on research during the period of the Summer Session will write course programs and have them approved in their respective schools or colleges during the week of pre-registration, April 11-14, 1966, graduate students will pre-register on Wednesday, April 13, *only*. Divinity School students will pre-register on April 13-14.

Advance Registration in the Summer Session Office. Students in residence whose course programs have been written and approved by their respective colleges on the dates indicated above may complete their registration in the Summer Session Office, 119 Allen Building, on the following dates:

Graduate and undergraduate students—May 10 through June 3
Registration in the Summer Session Office includes:

1. Completion of various Summer Session forms.
2. Payment of University fees.

A student who registers with the Summer Session Office during this period will not be required to be present at general registration on June 13. He will begin his class work on the date his classes are scheduled to begin: June 14 or June 21.

Students Not in Residence at Duke University during the Spring Semester, 1966

Advance Registration by Mail. Students not in residence at Duke University during the Spring Semester, 1966—new undergraduate students seeking to enter as degree candidates, graduate students who are not candidates for an advanced degree at Duke University, graduate and undergraduate students of other colleges and universities desiring to earn credits for transfer, public school teachers and college teachers (not advanced degree candidates)—may register by mail. Advance registration by mail includes:

1. Completion in full of the application form at the end of this *Bulletin*.
2. Admission to the Summer Session by the Director of the Summer Session and, in the case of students seeking to enter Duke University as degree candidates, admission by the Admission Directors to the school or college of Duke University concerned.

3. Completion in full and return of forms required by the Summer Session Office by June 3.
4. Payment of University fees by June 3. A student may *pre-enroll* by mail without paying the University fees but he *cannot register in advance* without doing so.

Students who complete registration by mail on or before June 3 need not be present at the general registration on June 13.

Degree Candidate Graduate Students Not in Residence during the Spring Semester, 1966. All graduate students not in residence during the Spring Semester, 1966, who are candidates for an advanced degree in the Graduate School of Arts and Sciences of Duke University *must* present themselves for registration in Central Records Office, 103 Allen Building, on June 13. They cannot complete registration by mail because:

1. Their program of study for the summer must be approved by their Director of Graduate Studies.
2. Their course programs must be written and approved by the Graduate School of Arts and Sciences.

These students may pre-enroll by mail with the Summer Session Office and may pay their fees in advance, but they cannot complete their registration.

Registration of Graduate Students

Graduate students in residence during the spring semester will pre-register for either or both terms of the Summer Session on April 13, *only*. Other students who have been admitted to the Graduate School should present themselves for registration at the official registration period, June 13 for the first term, and July 20 for the second term. They are required to register both with the Summer Session and the Graduate School.

Graduate students resident in the spring semester who intend to remain in residence during either or both of the two Summer Session terms without registering for course work or research must register for one unit (one semester hour) to cover the cost of medical care and the use of University facilities. This one unit (one semester hour) of registration will entitle students to use the Student Health Service and University facilities during both terms of the Summer Session. The Master's candidate who has completed all requirements except submission of the thesis and who so registers is not charged any separate fee for submitting the thesis.

Financial Information

Fees and Expenses

Fees

The University Fee. This fee, which covers registration, tuition, and medical care is \$40.00 per semester hour for undergraduates, \$40.00 per unit for the Graduate School. Special fees have been established for:

1. Teachers in full-time service in elementary and secondary schools: \$20.00 per semester hour.
2. Divinity School students approved by the Dean of that School: \$20.00 per semester hour.

Laboratory Fees. (These where applicable are in addition to the University fee.) The fee for the Marine Laboratory is \$10.00 per course. For Marine Laboratory investigators' research table fees, see the *Marine Laboratory Bulletin*.

Medical Mycology Fee. This fee of \$100.00 replaces the University fee.

Master's Degree Summer Session Fee. A Master's candidate who submits his thesis when not registered for at least the 1-unit research-residence fee is required to pay a 1-unit fee of \$40.00.

Auditing Fees. (See p. 34 for definition.) These fees are as follows:

1. Students registered for a full course program may audit non-laboratory courses (with the permission of the Director) at no extra charge.
2. Students carrying less than a full course program may be granted permission to audit a course or courses on payment of half the University fee per semester hour audited: \$20.00.

Late Registration Fee. Students who fail to register prior to the first class day of a given course will pay an extra fee of \$5.00.

Fee for Course Changes. Course changes other than those required by the University will be made only on payment of an extra fee of \$1.00.

Fee for Make-up Final Examination. This fee is \$5.00.

Refund of Fees. Fees will be refunded under the following circumstances:

1. When applications for withdrawal are received by the Director of the Summer Session before the close of registration on registration day, full fees will be refunded.
2. When applications for withdrawal are received by the Director of the Summer Session during the first four class days of a given term, 80 per cent of the fees will be refunded.
3. When applications for withdrawal are received by the Director of the Summer Session after the fourth class day, there will be no refund of fees.

Residence Hall Rooms—Rates

Single Room.....	9 weeks' term....	\$92.25
	6 weeks' term....	61.50
	5 weeks' term....	51.25
	4 weeks' term....	41.00
	3 weeks' term....	30.75
	1 week's term....	10.25
Double Room, per person.....	9 weeks' term....	\$78.75
	6 weeks' term....	52.50
	5 weeks' term....	43.75
	4 weeks' term....	35.00
	3 weeks' term....	26.25
	1 week's term....	8.75
Double Room furnished as a		
Single Room and Occupied by		
	one person.....	9 weeks' term....\$126.00
		6 weeks' term.... 84.00
		5 weeks' term.... 70.00
		4 weeks' term.... 56.00
		3 weeks' term.... 42.00
		1 week's term.... 14.00

Applications for room reservations at Duke University, accompanied by the full amount of the room rent for the term(s) concerned should be made to Director of Housing, Duke University, Duke Station, Durham, North Carolina. Rooms will be reserved in the order in which applications are received, and on certification of admission by the Summer Session Director. Notification of assignment to rooms will be made about May 30 for the first term; about July 10 for the second term.

Rooms are available to applicants twenty-four hours prior to the registration for a specific term of the Summer Session. A room is to be vacated by the occupant within twenty-four hours after his final examination. Any period of occupancy, other than for a specific term of the Summer Session, must be arranged with the Director of Housing, House D, Room 101-R, Duke University.

Refund of Room Rent. Refunds are made under the following circumstances:

1. When notification for room cancellation is received by the Housing Bureau on or before fifteen (15) days prior to the registration date of the Summer Session term, full room rent will be refunded.
2. When notification for room cancellation is received between the fifteen (15) days prior to registration date and the first four class days, 80 per cent of the room rent will be refunded.
3. When notification for room cancellation is received after the first four days of a Summer Session term, 70 per cent of the room rent for the unused period will be refunded.

Applicants should be sure to express their preference as to roommates, if they have a preference. If no preference of roommate is expressed the Director of Housing will assign a roommate; however, he does not assume responsibility in this matter.

Estimated Cost of One Term of Summer Session

University Fee, 6 s.h.....	\$240.00
(Teachers, elementary and secondary, in full-time service pay \$120.00)	
Dormitory Rooms (2 occupants, \$43.75 per person).....	43.75
Meals (Cafeteria selective; average per day \$2.00).....	72.00
Books and Class Materials \$7.00 to \$10.00.....	8.50
Miscellaneous (laundry, etc.).....	12.00
Total (elementary and secondary teachers in full-time service	
deduct \$120.00).....	\$376.25

Student Aid

Special Fees To Teachers

Teachers in full-time service in elementary and in secondary schools, who are accepted by the Summer Session, pay only \$20.00 per semester hour. Teachers on leave of absence from their schools and teachers not currently employed are not eligible for this special fee.

Scholarships for Public School Personnel

Duke University will offer thirty-six special scholarships of \$150.00 each to high school and elementary teachers on a competitive basis (not by a written examination) for the Summer Session of 1966. This scholarship program is designed to encourage teachers to begin or to continue their graduate studies leading to the A.M., M.Ed., or M.A. in Teaching degree.

Duke University will again offer six special scholarships of \$200.00 each to high school and elementary administrators and supervisors. This scholarship program is designed to encourage principals and supervisors to continue their graduate studies leading to advanced degrees.

Although successful applicants for the scholarships will not be required to become candidates for a degree, they must qualify for and receive admission to the Graduate School of Arts and Sciences.

All applications with supporting documents must be submitted by April 1, 1966. Selection and appointment of scholars will be completed by May 1, 1966.

Application blanks and complete information may be obtained from the Director of the Summer Session, Duke University, Durham, North Carolina.

Loans

A number of loan funds have been established for the benefit of the students of Duke University. Several of these funds are available to students enrolled in the Summer Session. These funds are administered through a committee of officers of the University.

The Committee, in approving loans, selects those students who, from the standpoint of character, scholastic attainment, and degree of financial need, are deserving of consideration.

Applicants for loans should make application to the Manager, Student Loan Office, Duke University. All applications must be initiated during the first week of each term. The granting or withholding of a loan is a matter entirely within the discretion of the Student Loan Committee. A student is expected to use all other possible means of securing financial assistance before applying for aid from a loan fund.

National Defense Education Act Loans. A limited number of loans may be made, under the provisions of the National Defense Education Act of 1958, to students in the Summer Session who have been regularly enrolled in the University prior to the Summer Session. A student who is enrolled for study in the Summer Session *only* is not eligible for consideration. Students pursuing the M.A.T. Cooperative Program are not eligible. Inquiries concerning opportunities available under this program should be addressed to the Manager, Student Loan Division, Duke University.

Remission of Tuition

Children of ministers who are members of the North Carolina and Western North Carolina Conferences of the Methodist Church are entitled to a remission of the tuition charge as are the children of ministers of all faiths residing in Durham County, North Carolina. This consideration is given only to the children of resident members of the two North Carolina conferences who are giving their full time to religious work. The remission of the tuition charge during the Summer Session is valued at one-half of the tuition charge. Only those students enrolled in a regular undergraduate program leading to a baccalaureate degree from Duke University are entitled to this benefit. Students in this group are entitled to a maximum of eight semesters of free tuition at the undergraduate level. Application for this benefit should be made to the Director of Financial Aid, Duke University.

Tuition Grants

Tuition grants are available to children of qualified staff members of Duke University. Information regarding the tuition grant program may be obtained by writing to the Director of Financial Aid, Duke University.

General Regulations

Academic Regulations

Kinds of Course Enrollment

Summer Session courses may be taken for “credit” or for “non-credit” or may be “audited.” A student’s program may be exclusively in one of these categories, or may combine any two of them or all three. Students taking a full or partial program for “credit” may enroll as auditors or as non-credit students in any number of additional courses.

Credit. The Summer Session term “credit” does not mean degree credit at Duke University unless the student has been admitted as a degree candidate by one of the colleges or schools of the University. A student taking a course for credit is expected to do all the work required and to take the final examination, and he will receive a grade. G.I. Bill benefits are available only to those veterans who enroll for credit.

Non-credit. “Non-credit” enrollment is available to the student who wishes the privilege of participating in class discussions, exercises, and the laboratory assignments but does not wish to take the examinations, either mid-term or final. A “non-credit” student may do as much of the work of the course as he desires, but he may not take the final examination and he will not receive a grade. Full fees of \$40.00 per semester hour are required in “non-credit” enrollment.

Audit. An auditor is entitled to listen to lectures and class discussions,

but he may not participate in discussions or take examinations. Students may not enroll as auditors in laboratory courses. A student carrying a full program for credit may be given permission to audit as many courses as he desires without additional fees. Students carrying less than a full program for credit may secure permission to audit but are required to pay the auditing fee of \$20.00 per semester hour

Credits

The Summer Session courses are of the same quality and credit values as courses in the regular semester. Credit earned in the Summer Session is in terms of semester hours. The majority of Summer Session courses carry 3 semester hours' credit and require one term in residence. A limited number of basic courses in the sciences carry 4 s.h. credit (Chemistry, Geology, Physics, Zoology).

Credits for Transfer. A student desiring either graduate or undergraduate credits transferred from Duke University to his university or college as degree credit must request from the Director of the Summer Session, Duke University, a "Course Approval Form" to be completed by the student's Dean or Registrar and return to the Director of the Summer Session, Duke University.

Transfer of Graduate Credits. Under certain circumstances a maximum credit of 6 units in a Master's degree program may be allowed for graduate courses completed elsewhere. Approval for the transfer of credits will not be given until the student has spent one semester or two terms in residence. The acceptance of credit up to this amount will not reduce the minimum period of full-time registered residence at Duke University. In no case will credit be allowed for extension or correspondence courses.

With the approval of both the student's major department and the Dean of the Graduate School, a student who is granted such transfer for credit may be permitted to register for as much as 12 units for thesis research instead of the usual 6 units. Or he may be permitted to fill out his schedule with as much as 6 semester hours of further undergraduate training or 6 semester hours of required language courses on the undergraduate level.

For regulations concerning applying graduate credit earned elsewhere to a graduate program here, consult the Graduate School *Bulletin*.

See page 11 for information concerning reciprocal agreement with the Consolidated University of North Carolina.

Professional Credits Toward Teacher's Certificates. Professional credits toward teacher's certificates are granted by the various state boards of education, each in accordance with its own carefully planned rules. Teachers in service, before enrolling for certification credit, should consult the rules laid down by their State Board of Education. If necessary,

they should send to their State Board of Education a list of the courses in which they plan to enroll and inquire whether these will be acceptable for certification credit.

The Normal Course Program

The normal and maximum program for one term of the Summer Session is 6 semester hours, except in cases where students take a 4 semester hour language course. In those cases 7 semester hours per term will be allowed. The 4 semester hour courses in the sciences run for four weeks and one such course constitutes a full course program. Four semester hour courses in the sciences do not meet on Saturday.

Grading

Only a student taking a course for credit will receive a grade. The grade given represents the quality of the work done in the course.

Passed.

Undergraduate Grades

A—excellent

B—good

C—average

D—poor but passing

Graduate Grades

E—exceptional

G—good

S—satisfactory

Failed. A grade of F indicates that the student has failed the course, and in order to receive credit for the course he must repeat the work in class.

Incomplete. A grade of I may be reported by the instructor if for any reason he is unable to report the final grade at the regular time. Incomplete courses must be completed before the close of the succeeding semester; otherwise the I is recorded as F, and the course must be repeated in class if the student is to receive credit for it.

Absent from Final Examination. The grade X indicates that the student was absent from the regularly scheduled examination. A student absent from examination, if the absence has been excused by the dean of the college or school in which he is enrolled or, in the case of the special or unclassified student, by the Director of the Summer Session, may receive an examination upon the payment of \$5 to the Treasurer of the University. The instructor concerned arranges for the examination in cases where absences are excused. A student with an X grade who has not obtained a passing grade before the end of the semester following that in which the X was incurred is regarded as having failed in the course concerned and must repeat the work in class in order to receive credit. If a student's absence from an examination is not excused by the dean of the college or school in which he is enrolled or, in the case of the

special or unclassified student, by the Director of the Summer Session, his grade for the course concerned is recorded as F.

Examinations

Final examinations in courses are held on the last two days of each term. Final examinations for short courses which occupy the student's complete program will be held on the last day of the course. The examination dates for 1966 are:

First term: July 16, 18.

Second term: August 23, 24.

Courses in science for the first term have been scheduled so that their final examination will come on July 18. The science courses which begin July 21 and run for four weeks will have their final examination on August 17. The University has no provision for giving examinations *in absentia*. Students absent from examinations for valid reasons are permitted a liberal extension of time to return to the University for completion of credit.

Dropping of Courses

If a student drops a course without permission from the dean of the school or college in which he is enrolled or, in the case of the special or unclassified student, the Director of the Summer Session, the grade for that course is recorded as F. If he drops a course with permission, the grade for that course is F unless, in the judgment of the dean or director, circumstances do not justify this penalty.

Withdrawal from the Summer Session

If a student wishes to withdraw from the Summer Session, he must notify both the dean of the school or college in which he is registered and the Director of the Summer Session.

Other Regulations

Motor Vehicle Registration

Students enrolled in the Summer Session must register their motor vehicles with the Traffic Office, 08 Social Science, West Campus.

Courses of Instruction

Eligibility for Course Enrollment

Courses numbered 1-49 are primarily for freshmen, or freshmen and sophomores. Courses numbered 50-99 are ordinarily for sophomores, or sophomores and juniors. Courses numbered 100-199 are designed for juniors and seniors. Courses numbered 200-299 are planned for seniors and graduates. Courses numbered 300 up admit graduate students only. Courses numbered from 200 up are limited in enrollment to 25 students.

Minimum Enrollment Required for Courses

All courses are offered subject to minimum enrollments. The University reserves the right to withdraw undergraduate courses in which fewer than twelve students enroll, senior-graduate courses numbered 200-299 in which fewer than ten students enroll, and graduate courses and seminars numbered 300 or above in which fewer than six students enroll. In withdrawing a course, the University attempts to avoid undue hardships on students. Sometimes, therefore, courses are offered in spite of small enrollments. Courses not listed will be given when a demand develops and an instructor is available.

Department Officers and Regulations

Departments offering Summer Session programs are listed alphabetically. Under each department is given the name of the chairman

and the name of the director of graduate studies. Where departments have set up special regulations for admission to candidacy for the Master's degree, these are included.

Botany

Professor T. W. Johnson, Jr., *Chairman* (141 Biological Sciences Building, West Campus); Professor A. W. Naylor, *Acting Director of Graduate Studies* (061 Biological Sciences Building, West Campus)

Students admitted to candidacy for an advanced degree in botany should have completed a minimum of 12 semester hours of courses in botany (or biology) beyond an elementary course, and related work in biological sciences. Students who have not yet had the minimum hours, however, may enter higher courses by permission of the instructor, if he is convinced that they can carry the work for undergraduate credit, and may count such work toward hours necessary for candidacy.

First Term (Duke Campus)

225. *Special Problems*. Hours to be arranged. *Staff*
359. *Research*. Hours to be arranged. *Staff*

First Term (Duke Marine Laboratory, Beaufort, North Carolina)

- 207 (Beaufort). *Marine Mycology*. Introduction to the structure, classification, culture, and physiology of marine and brackish water fungi. Special problems on groups or individual species. Lectures, laboratory, field trips, introduction to periodical literature, and individual investigations. 6 s.h. *Johnson*
225. *Special Problems*. Hours to be arranged. *Searles and Johnson*
359. *Research*. Hours to be arranged. *Searles and Johnson*

Second Term (Duke Campus)

226. *Special Problems*. Hours to be arranged. *Staff*
360. *Research*. Hours to be arranged. *Staff*

Second Term (Duke Marine Laboratory, Beaufort, North Carolina)

- 211 (Beaufort). *Marine Phycology*. An introduction to marine algae: their identification, taxonomy, morphology, physiology and ecology. Field trips complemented by laboratory study, culturing, and preparation of herbarium material. 6 s.h. *Searles*
226. *Special Problems*. Hours to be arranged. *Searles and Johnson*
360. *Research*. Hours to be arranged. *Searles and Johnson*

Chemistry

Professor Charles K. Bradsher, *Chairman* (114 Chemistry Building, West Campus); Professor Louis D. Quin, *Director of Graduate Studies* (09 Chemistry Building, West Campus)

All classes in Chemistry, Term I, will begin on June 21 and continue through July 18. All classes in Chemistry, Term II, will begin on July 21 and continue through August 17. Students who wish to avoid paying a late registration fee must have their registration completed in advance of these dates. For registration dates see *General Registration* on page 25 of this *Bulletin*. (Chemistry classes will not meet on Saturdays.)

First Term

1. General Inorganic Chemistry. Lectures, recitations, and laboratory work on the elementary principles of chemistry and on the occurrence, preparation, properties, and uses of the elements and their compounds. Laboratory daily, 8:30-10:00; recitation daily, 11:00-12:00; lecture daily, 12:00-1:00. 4 s.h. *Bonk*

61. Fundamentals of Analytical Chemistry. A study of the relations of electrolytes in solution and of chemical equilibrium illustrated by laboratory experiments involving the techniques of gravimetric, volumetric, and colorimetric analysis. Prerequisites: Chemistry 1-2 and Mathematics 21 or equivalent. Lecture or recitation daily, 8:30-10:00; laboratory daily, 10:30-12:30 and 1:30-4:00. 4 s.h. *Toren*

151. Organic Chemistry. An introduction to the study of carbon compounds. Compounds of the aliphatic series form the basis of lectures, discussions and laboratory experiments. Prerequisite: Chemistry 61. Recitation daily, 8:00-9:00; laboratory daily, 9:00-12:00; lecture daily, 12:00-1:00. 4 s.h. *Brown*

275. Thesis Research. Research in the fields of physical, analytical, inorganic, or organic chemistry. Open to those students whose research programs for the A.M. and Ph.D. degrees have been approved by the department and by one of the instructors in charge of the course. Schedule to be arranged. (Not more than one semester hour of credit per week for full-time schedule or one semester hour each two weeks for half-time schedule.) 2 to 8 s.h. Available Terms I and II.

Second Term

2. General Inorganic Chemistry. A continuation of 1. Prerequisite: Chemistry 1. Laboratory daily, 8:30-10:00; recitation daily, 11:00-12:00; lecture daily, 12:00-1:00. 4 s.h. *Hill*

152. Organic Chemistry. A study of compounds of the aromatic series and of carbohydrates and proteins. Prerequisite: Chemistry 151. Recita-

tion daily, 8:00-9:00; laboratory daily, 9:00-12:00; lecture daily, 12:00-1:00. 4 s.h. *Kilgore*

Classical Studies

Professor Robert S. Rogers, *Chairman and Director of Undergraduate Studies in Latin* (204 Carr Building, East Campus); Professor James N. Truesdale, *Director of Undergraduate Studies in Greek* (105 Language Building, West Campus)

Greek

First Term

121. Greek Literature: Homer—*Iliad* and *Odyssey*. The purpose of this course is to give a general survey of the life and civilization of the Greeks, especially to those who have never studied the language but wish to become acquainted with some of the choicest portions of the literature by the use of translations. The *Iliad* and the *Odyssey* are read in translation, and the excavations and discoveries at Troy and other cities of the Aegean age are discussed. 7:40-9:00. 3 s.h. *Truesdale*

122. Greek Literature: *The Tragic Poets*. The purpose of this course is similar to that of course 121. Many of the extant plays of Aeschylus, Sophocles, and Euripides are studied in English translations. 9:20-10:40. 3 s.h. *Truesdale*

Latin and Roman Studies

First Term

91. Latin Prose. Selections from prose authors or Cicero's *De Senectute* and *De Amicitia*, or selected books of Livy's history with special emphasis on developing competence in reading Latin. 7:40-9:00. 3 s.h. *Wooley*

92. Latin Poetry. Selections from the greatest Latin poets, especially Horace's *Odes*. 11:00-12:20. 3 s.h. *Wooley*

111. Roman Literature in English Translation. Selected readings of Latin literature in English translation with emphasis on the drama, lyric poetry, and the varied contributions of Cicero to literature. 9:20-10:40. 3 s.h. *Womble*

112. Roman Literature in English Translation. Selected readings of Latin literature in English translation with emphasis on the epic, the satire, and the novel. 11:00-12:20. 3 s.h. *Womble*

Comparative Literature

First Term

191. *Independent Study.* Directed reading and research. Open only to qualified students in the junior year, by permission of the Department. 6 s.h. *Salinger*

205. *Foundations of Twentieth-Century European Literature.* The roots of the contemporary scene (Proust, Mann, Rilke, Kafka, Eyvind Johnson, Anouilh, Lagerkvist, Camus) evolving toward a mythology of man. 11:00-12:20. 3 s.h. *Salinger*

Economics

Professor Robert S. Smith, *Chairman* (306 Social Science Building, West Campus); Professor Frederick C. Joerg, *Director of Undergraduate Studies* (316 Social Science Building, West Campus); Associate Professor William P. Yohe, *Director of Graduate Studies* (322 Library, West Campus)

First Term

51. *Principles of Economics.* A course in the essential principles of economic science. (Credit for Ec. 51 will not be given until Ec. 52 has been completed.) 9:20-10:40. 3 s.h. *Pethia*

57. *Principles of Accounting.* Elementary principles of single proprietorship, partnership, and corporation accounting. June 13-June 30. 7:40-12:20. 3 s.h. *Keane*

58. *Principles of Accounting.* A continuation of Economics 57. July 1-July 18. 7:40-12:20. 3 s.h. *Keane*

138. *Business Statistics.* A survey of the principal statistical methods and their application to economics and business administration. The course deals with collection of statistical data, construction of statistical tables and charts, and a brief study of the fundamental statistical concepts and techniques. 11:00-12:20. 3 s.h. *Wallace*

143. *Corporation Finance.* Principles and problems in the financial organization of corporations; the study of corporate securities, the management of capital, the distribution of earnings; industrial combinations; insolvency and reorganization. Prerequisite: Economics 57-58, Principles of Accounting. 7:40-9:00. 3 s.h. *Pethia*

287. *Public Finance.* An analysis of the impact of governmental expenditures, revenues, and debt on the allocation of resources, the redistribution of income, and the stabilization of income. 9:20-10:40. 3 s.h. *Wallace*

318X. *Thesis Seminar.* *Wallace*

Second Term

52. Principles of Economics. A continuation of Economics 51. 9:20-10:40. 3 s.h. *Naylor*

146. Managerial Economics. Economic analysis of the business firm, its goals, and the economic environment of business. Economic theory of the firm; various mathematical models of the firm; the internal decision-making processes. No credit for those who have completed Economics 149. 7:40-9:00. 3 s.h. *Naylor*

153. Money and Banking. The lender's side of financial markets. The activities of commercial banks and other financial institutions in supplying loanable funds and the effects of these activities on the money supply and its rate of use, the impact of central bank and Treasury operations on financial markets, and the evolution of the present monetary system and its institutions. 11:00-12:20. 3 s.h. *Yohe*

154. Aggregative Economics. Concepts and measurement of national income and expenditures, employment, and price levels; the theoretical determination of these aggregates; and applications of macro-economic theory to business cycles and economic growth. 9:20-10:40. 3 s.h. *Yohe*

318X. Thesis Seminar. *Yohe*

Education

Professor Roland H. Nelson, *Chairman* (o8D West Duke Building, East Campus); Professor Edward C. Bolmeier, *Director of Graduate Studies* (o8D West Duke Building, East Campus)

Duke University is accredited by the National Council for Accreditation of Teacher Education for the preparation of elementary and secondary school teachers and school service personnel with the Doctor's degree as the highest degree approved.

For admission to candidacy for the Master of Arts (A.M.) degree with major in Education, or for the Master of Education (M.Ed.) degree, students must, in addition to meeting the general requirements for admission to the Graduate School, meet the following specific requirements: Credit for (1) eighteen semester hours of acceptable prior work in Education and (2) twelve semester hours of acceptable prior work in a minor field. If Psychology, Sociology, Economics, or Political Science is chosen for the minor, six semester hours of work completed after entering the junior year in college will be accepted.

The degree of Master of Arts is available in the divisions of School Administration and Supervision, Secondary Education, Elementary Education, and Guidance and Counseling. Every candidate for the Master of Arts degree in the Department should elect at least twelve semester hours in one of these divisions in which he plans to write his thesis and the

remainder of his work, including the six semester hours in his minor, with the approval of the proper division adviser. The degree of Master of Education is available in the divisions of School Administration and Supervision, Secondary Education, Elementary Education and the Teaching of Emotionally Disturbed Children. Mr. Bolmeier, Mr. Hurlburt, Mr. Nelson, and Mr. Stumpf are advisers to students in School Administration and Supervision; Mr. Petty, Mr. Sublett and Miss Rudisill are advisers in Elementary Education; Mr. Bolmeier, Mr. Cartwright, Mr. Githens, and Mr. Shuman are advisers in Secondary Education; and Mr. Colver, Mr. Gehman, and Mr. Weitz are advisers in Guidance and Counseling. Mr. Cartwright and Mr. Hurlburt are advisers for the Master of Arts in Teaching program. Candidates for the Master of Arts, Master of Education, or Master of Arts in Teaching degree should read with special care the regulations of the Graduate School as set forth on pages 7-9. Candidates for the Master of Arts in the field of guidance should consult the special brochure on guidance available from the Dean of the Graduate School.

It is the intention of the Department to make available to degree candidates all courses ordinarily required for certification as graduate teachers, counselors, principals and superintendents. These courses will normally be offered at least once every three years.

First Term

107. *Elementary Education: Arithmetic.* The processes, methods, and materials basic to the teaching of arithmetic in the elementary school. Required in the elementary-education major. (June 20-July 1.) 11:00-12:20 plus Monday and Wednesday, 2:00-4:00. 2 s.h. *Sandefur*

(Persons participating in the Contemporary Mathematics for Elementary Teachers' Workshop will also participate in this course.)

204. *The School as an Institution.* Consideration is given to the place of the school in the American social order, and its adaptation to the social, economic, and political changes. Special attention is directed to the responsibility (1) of the school for seeking solutions to the perplexing problems of youth created by a changing society; and (2) of the government for providing greater equality of educational opportunity. 9:20-10:40. 3 s.h. *Nelson*

211. *The Problem Child (also Psychology 211).* Study of problem behavior and adjustment in children with emphasis on the causes and treatment of conduct and neurotic disorders of the maladjusted child. Particular attention will be paid to mental hygiene principles in the handling of problem children in school and home. 9:20-10:40. 3 s.h. *I. Gehman*

213. *Elementary-School Organization and Administration.* This course is designed especially for principals, teachers, and other prospective members of the elementary-school staff. The scope of elementary education

is considered to encompass nursery school, kindergarten, and the elementary school. Special treatment is given to the problems of internal organization and management of the elementary school, and its integration with the secondary-school level. 11:00-12:20. 3 s.h. *Sublett*

217. *The Psychological Principles of Education.* An advanced study of teaching, learning, and the learner. Selected problems guiding the reading of students will be discussed in class. 11:00-12:20. 3 s.h. *W. S. Gehman*

232. *Supervision of Instruction.* A survey of supervision as a means of improving instruction and adapting the curriculum to the learner and to community needs. 9:20-10:40. 3 s.h. *Hurlburt*

235. *The Nature, Function, and Reorganization of the Curriculum.* Selected problems guiding the reading of students. 9:20-10:40. 3 s.h. *Sublett*

237. *Literature for Adolescents.* This course offers a critical survey of literature written for, or appropriate for, junior and senior high-school students. Fiction, non-fiction, biography, poetry, and drama are examined. Both adult and transition-type literature are considered. Methods of organizing the program in literature are explored. 7:40-9:00. 3 s.h. *Shuman*

239. *Methods and Problems of Teaching English in Secondary Schools.* This course will present sound methods of teaching the reading of literature and other forms of writing, language, grammar and composition. Materials will include selections found in widely adopted textbooks, numerous specimen themes for grading, and current books and articles in the field. Several short compositions and a report will be required. 9:20-10:40. 3 s.h. *Shuman*

241. *Principles of Guidance.* An historical survey of the philosophies of guidance; a study of the interrelationships between instruction, administration, and guidance in education. Prerequisite: 6 hours of psychology or educational psychology. 7:40-9:00. 3 s.h. *Colver*

243. *Personality Dynamics.* A study of personality structure and dynamics with emphasis upon the implications for counseling and instruction. Prerequisite: 6 hours of psychology or educational psychology. 9:20-10:40. 3 s.h. *W. S. Gehman*

246. *The Teaching of Mathematics.* This course deals with such topics as aims, curriculum, course and lesson planning, and classroom procedure for teaching secondary-school mathematics. (June 21-July 11.) 11:00-12:20, Monday through Saturday and 2:00-3:20, Monday through Friday. 3 s.h. *Reynolds*

253. *School Law.* The primary purpose of this course is to familiarize school administrators and teachers with the legal features of school organization and administration. Although some attention is given to constitutional and statutory provisions, the main emphasis is upon court decisions relating to education. Students are expected to select appro-

priate problems in school law for intensive study. 7:40-9:00. 3 s.h. *Bolmeier*

276. *The Teaching of High-School Science.* Discussion, lectures and collateral reading, related to such topics as aims, tests, curriculum, classroom and laboratory procedure, field trips, course and lesson planning for secondary-school science. 11:00-12:20 daily plus Monday, Wednesday, and Friday. 3 s.h. *Githens*

315. *Seminar in Secondary-School Teaching.* Advanced level consideration of principles, practices, and problems in secondary-school instruction. Designed particularly to accompany an internship. For students without previous internship credit, this course must be accompanied by Education 216.

315.1 7:40-9:00. 3 s.h. *Nelson*

315.2 7:40-9:00. 3 s.h. *Hurlburt*

Second Term

201. *Teaching and Supervision of Arithmetic.* Special attention is given to the number system, the fundamental operations (with whole numbers, fractions, and decimals), percentage, and measurements. Considered also are the meaning theory, methods of teaching, problem solving, evaluation, practice and drill, and selection and graduation of arithmetical contents. This course is designed for teachers and supervisors in the elementary school. 11:00-12:20. 3 s.h. *Flowers*

203. *Principles of School Administration.* The fundamental facts and procedures of school administration, an analysis of the problems and policies of the organization and direction of a local school system, and the functions of the various school officials. 9:20-10:40. 3 s.h. *Stumpf*

223. *Teaching the Language Arts.* Comparison of current methods and materials in the teaching of handwriting, spelling, and oral and written composition. Analysis and correction of basic difficulties. Increasing opportunities for creative expression. Correlation of language arts with other activities and school subjects. 9:20-10:40. 3 s.h. *Fulbright*

225. *The Teaching of History and the Social Studies.* Evaluation of the objectives, content, materials, and methods in the teaching of history and the social studies. 9:20-10:40. 3 s.h. *Cartwright*

228. *Improvement of Instruction in the Social Studies.* An advanced treatment of curriculum, methods, and materials in the social studies. Individuals will concentrate on subjects and grade levels of their choice. 11:00-12:20. 3 s.h. *Cartwright*

234. *Secondary-School Organization and Administration.* This course is designed especially for principals, teachers, and other prospective members of the secondary-school staff. The scope of secondary education is considered to encompass junior high school, regular high school, senior high, and junior college. Special treatment is given to the problems of internal organization and management. 7:40-9:00. 3 s.h. *Bolmeier*

258. Educational Measurements. A critical study of the principles and techniques involved in measurement in education, with opportunity for individual research. Prerequisite: twelve semester hours in the Department, including a course in educational psychology. 11:00-12:20. 3 s.h. *Simono*

323. Public School Finance. A study of educational costs, sources of revenue for the support of public education, collection of revenue, basis of distribution, and accounting for funds spent. 9:20-10:40. 3 s.h. *Stumpf*

Engineering

Professor J. L. Meriam, *Dean of the College of Engineering* (136 Engineering Building, West Campus); Professor Charles R. Vail, *Associate Dean for Graduate Study and Research* (130 Engineering Building, West Campus)

First Term

C. E. 110. Plane Surveying. Use and adjustment of instruments; transit-tape, stadia, and plane table surveying; differential and profile leveling; calculation of bearings, latitudes, departures, and areas; accuracy and errors. Prerequisites: trigonometry; engineering graphics desired. June 13-July 1. 3 s.h. (Note: First class meets at 1:00 p.m., June 13. Classes do not meet on Saturdays.) *Staff*

C.E. 297, 298. Thesis Research. A student with the proper background may carry on research under the direction of the staff in one of the following fields: engineering mechanics; foundation engineering; hydraulic engineering; materials science; structural engineering; or sanitary engineering. Thesis credit only. 6 s.h. *Graduate Staff*

C.E. 365. *Advanced Topics in Civil Engineering. Opportunity for study of advanced subjects relating to programs within the Civil Engineering Department tailored to fit the requirements of a small group. 1 to 3 s.h. *Graduate Staff*

C.E. 399. *Special Readings in Civil Engineering. Special individual readings in a specific area of study in Civil Engineering. Prerequisite: approval of the Director of Graduate Studies. 1 to 3 s.h. *Graduate Staff*

E.E. 265. *Advanced Topics in Electrical Engineering. Opportunity for study of advanced subjects related to programs within the Electrical Engineering Department tailored to fit the requirements of a small group. Prerequisite: approval of the Director of Graduate Studies and of instructor under whom work will be done. 1 to 3 s.h. *Graduate Staff*

E.E. 297, 298. Thesis Research. A student with the proper background may carry on research under direction of a member of the staff in one of

the following fields: dielectric materials; magnetic materials; energy conversion; instrumentation; high voltage phenomena. Master's thesis credit only. 6 s.h. *Graduate Staff*

E.E. 399. **Special Readings in Electrical Engineering*. Special individual readings in a specified area of study in electrical engineering. Prerequisite: approval of the Director of Graduate Studies. 1 to 3 s.h. *Graduate Staff*

M.E. 265. **Advanced Topics in Mechanical Engineering*. Opportunity for study of advanced subjects related to programs within mechanical engineering tailored to fit the requirements of a small group. Prerequisite: approval of the Director of Graduate Studies and of instructor under whom work will be done. 1 to 3 s.h. *Graduate Staff*

M.E. 297, 298. *Thesis Research*. A student with proper background may carry on research under the direction of the staff in one of the following fields: systems engineering; thermodynamics; heat transfer; and fluid flow. Thesis credit only. 6 s.h. *Graduate Staff*

Second Term

C.E. 297, 298. *Thesis Research*. A student with the proper background may carry on research under the direction of the staff in one of the following fields: engineering mechanics; foundation engineering; hydraulic engineering; materials science; structural engineering; or sanitary engineering. Thesis credit only. 6 s.h. *Graduate Staff*

C.E. 365. **Advanced Topics in Civil Engineering*. Opportunity for advanced subjects relating to programs within the Civil Engineering Department tailored to fit the requirements of a small group. 1 to 3 s.h. *Graduate Staff*

C.E. 399. **Special Readings in Civil Engineering*. Special individual readings in a specific area of study in Civil Engineering. Prerequisite: approval of the Director of Graduate Studies. 1 to 3 s.h. *Graduate Staff*

E.E. 265. **Advanced Topics in Electrical Engineering*. Opportunity for study of advanced subjects related to programs within the Electrical Engineering Department tailored to fit the requirements of a small group. Prerequisite: approval of the Director of Graduate Studies and of instructor under whom work will be done. 1 to 3 s.h. *Graduate Staff*

E.E. 297, 298. *Thesis Research*. A student with the proper background may carry on research under direction of a member of the staff in one of the following fields: dielectric materials; magnetic materials; energy conversion; instrumentation; high voltage phenomena. Master's thesis credit only. 6 s.h. *Graduate Staff*

E.E. 399. **Special Readings in Electrical Engineering*. Special individual readings in a specified area of study in electrical engineering. Prerequisite: approval of the Director of Graduate Studies. 1 to 3 s.h. *Graduate Staff*

* Offered only upon sufficient demand; enrollment limited.

M.E. 265. *Advanced Topics in Mechanical Engineering. Opportunity for study of advanced subjects related to programs within mechanical engineering tailored to fit the requirements of a small group. Prerequisite: approval of the Director of Graduate Studies and of instructor under whom work will be done. 1 to 3 s.h. *Graduate Staff*

M.E. 297, 298. Thesis Research. A student with proper background may carry on research under the direction of the staff in one of the following fields: systems engineering; thermodynamics; heat transfer; and fluid flow. Thesis credit only. 6 s.h. *Graduate Staff*

English

Professor Lionel Stevenson, *Chairman* (325 Allen Building, West Campus); Professor Holger Nygard, *Director of Graduate Studies* (321 Allen Building, West Campus)

Candidates for the Master's degree in English are expected to have had at least twelve semester hours in undergraduate courses above the sophomore level. The Department may also require additional courses if the work of the student in his first term indicates inadequate preparation.

First Term

55. Representative British Writers. Chaucer's Prologue to *The Canterbury Tales*, and at least two tales, Shakespeare's *I Henry IV*, *Hamlet*, or *King Lear*, and one other play, John Donne's poetry (selections), and Milton's *Paradise Lost* (selections) and some of the shorter poems. 9:20-10:40. 3 s.h. *Jordan*

57. Representative American Writers. Selections and complete works of Poe, Emerson or Thoreau, Hawthorne, Melville, Whitman, Emily Dickinson, and Mark Twain. 7:40-9:00. 3 s.h. *McElroy*

209. Present-Day English. A description of present-day American English from the point of view of modern linguistic theory; comparison of traditional and structural grammars; semantic change; the relation of the written to the spoken language; usage. 9:20-10:40. 3 s.h. *Nygard*

230. American Literature, 1800-1865. The writers emphasized are Poe and Melville. 9:20-10:40. 3 s.h. *Turner*

237. English Drama, 1642-1800. The heroic play and the comedy of manners of the Restoration; the important plays, serious and comic, of the eighteenth century. 11:00-12:20. 3 s.h. *Ward*

252. English Literature in the Seventeenth Century. Major works in prose, poetry, and drama from 1650 to the death of Dryden. 7:40-9:00. 3 s.h. *Ward*

306. Studies in Chaucer. Cultural background, sources, themes, struc-

tures; special attention to *Troilus* and the dream-vision poems. 7:40-9:00. 3 s.h. *Nygard*

333. *Hawthorne and Melville*. Extensive reading in the works of Hawthorne and Melville, and close study of selected writings. 11:00-12:20. 3 s.h. *Turner*

Second Term

56. *Representative British Writers*. Novels by Fielding (*Joseph Andrews*), Dickens (*Great Expectations*), and Hardy (*The Mayor of Casterbridge*), and selections from the poetry of Pope, Wordsworth, Keats, and Yeats. 9:20-10:40. 3 s.h. *Moore*

58. *Representative American Writers*. Selections and complete works of James, Frost or Robinson, Dreiser, O'Neill, Cummings, and Faulkner or Hemingway. 7:40-9:00. 3 s.h. *McElroy*

222. *English Literature of the Early Nineteenth Century*. The British Romantic poets and prose writers, 1810-1830, with special attention to Byron, Shelley, and Keats. 7:40-9:00. 3 s.h. *Stevenson*

223. *English Literature of the Later Nineteenth Century*. Some of the most important works of the period with special attention to Carlyle, Dickens, Thackeray, Tennyson, and Browning. 9:20-10:40. 3 s.h. *Stevenson*

234. *American Literature, 1865-1920*. Selected works of representative authors of the period: Crane, Norris, Moody, London, Dreiser, Edith Wharton, Willa Cather, O'Neill, Robinson, and Frost. The lectures will deal primarily with literary trends as shaped by the social background. 9:20-10:40. 3 s.h. *Duffey*

332. *Whitman*. A detailed study of *Leaves of Grass* and of selected prose works. 11:00-12:20. 3 s.h. *Gohdes*

Forestry

Professor E. S. Harrar, *Dean of the School of Forestry* (213 Biological Sciences Building, West Campus); Professor J. G. Yoho, *Director of Graduate Studies* (104 Biological Sciences Building, West Campus)

Organized course work in the School of Forestry during the Summer Session is limited to forest surveying, dendrology, and forest mensuration. These courses are required of all students entering upon two years of study in technical forestry leading to the degree of Master of Forestry.

Qualified students may engage in thesis research in certain branches of forestry during the Summer Session with the approval of the instructor concerned and the Dean of the School of Forestry, or of the Director of Graduate Studies in the case of work taken through the Graduate School.

First Term

141. Dendrology. Nomenclature, classification, and identification of woody plants with special reference to species indigenous to southeastern United States and other important forest regions of temperate North America. Laboratory and field studies in the southern Appalachian Mountains, Piedmont Plateau and Atlantic Coastal Plain. Prerequisites: One year of biology including botany. (Three weeks, eight hours a day.) Instruction begins June 13, and continues through July 2. 3 s.h. *White*

150. Forest Surveying. Application of plane surveying to forest problems, including use and adjustment of instruments; boundary, topographic and cover type surveys; details of land ownership, title, and transfer. Prerequisites: trigonometry; engineering graphics desirable. (Three weeks, eight hours a day.) Instruction begins July 4, and continues through July 23. 3 s.h. *Chaiken*

Second Term

151. Forest Mensuration. Field studies in methods of measuring content and growth of trees and forest stands; practice in timber estimating, log scaling, use of mensurational instruments, and collection of basic data. (Four weeks, eight hours a day.) Instruction begins on August 1 and continues through August 27. 4 s.h. *Osborne*

152. Timber Harvesting Techniques. Techniques and trends in the harvesting of forest products in the southeastern United States; field observation and critique of harvesting operations; tree- and log-grading for various products. Prerequisites: Forestry 141, 150. (One week, eight hours a day.) Instruction begins July 25 and continues through July 30. 1 s.h. *White*

357. Research in Forestry. Open to students whose research programs for the M.F. or D.F. degree have been approved by the Dean of the School of Forestry and the instructor responsible for directing the research and whose programs for the A.M. or Ph.D. degree have been approved by the Director of Graduate Studies and the instructor in charge. (Credits and schedule to be arranged.) June 12-August 24. 2 to 12 s.h. (Not more than one semester hour of credit per week for full-time schedule or one semester hour each two weeks for half-time schedule.) (Consult courses 301-302 in *Announcement* of School of Forestry for letter designation of branches of forestry in which research is to be conducted.) *Staff*

Geology

Professor E. Willard Berry, *Chairman* (019 Science Building, East Campus)

The class in Geology, Term I, will begin on June 21 and continue

through July 18. The class in Geology, Term II, will begin on July 21 and continue through August 17. Students who wish to avoid paying a late registration fee must have their registration completed in advance of these dates. For registration dates see *General Registration* on page 25 of this *Bulletin*. (Geology classes will not meet on Saturdays.)

First Term

51. General Geology. This course is designed to give a general view of the surface features of the earth, their origin, structure, and materials. Illustrative materials are studied in the laboratory. Excursions may be made to neighboring points where principles of the science are studied in the field. Lectures or recitations, 8:00-10:30 daily; laboratory, 1:00-4:00. Monday through Thursday. June 21-July 18. 4 s.h. *Heron*

Second Term

52. General Geology. This course is designed to give some knowledge of the chief events of the earth's history. Excursions may be made to suitable neighboring localities. Lectures or recitations, 8:00-10:30 daily; laboratory, 1:00-4:00. Monday through Thursday. July 21-August 17. 4 s.h. *Heron*

205 (Beaufort). Marine Geology. The study of the broad geologic aspects of the ocean basins, including origin, bottom physiography, sediment distribution and sedimentary processes. Observations in the field will be emphasized and will include training in sampling procedures for both shallow and deep water. (This course is not open to students who have completed Geology 206.) 6 s.h. *Pilkey*

German

Professor Herman Salinger, *Chairman* (104 Language Building, West Campus)

The work in German 1, 2, 63, and 64 will be coordinated with listening and oral practice in the language laboratory which students in German classes will be privileged to attend.

First Term

1. Elementary German. Practice in understanding, speaking, reading, and writing. Classroom techniques are combined with those of the language laboratory. 11:00-12:20; and on Tuesdays and Fridays, 2:00-3:20. 4 s.h. *Bessent*

63. Intermediate German. Grammar review and composition; reading.

of short stories, novels, and poems. Prerequisite: German 1-2, or two units of high-school German. 9:20-10:40. 3 s.h. *Bessent*

64. Intermediate German. Continuation of German 63. Prerequisite: German 63 which may be taken concurrently. 11:00-12:20. 3 s.h. *Seymour*

Graduate Reading Course. An intensive course in German to develop rapidly the ability to read technical German in several fields. For graduate students only. 9:20-10:40. No degree credit. *Seymour*

191. Independent Study. Directed reading and research. Open only to qualified students in the junior year, by permission of the Department. 6 s.h. *Salinger*

Second Term

2. Elementary German. Practice in understanding, speaking, reading, and writing. Classroom techniques are combined with those of the language laboratory. Prerequisite: German 1 or equivalent. 11:00-12:20; and on Tuesdays and Fridays, 2:00-3:20. 4 s.h. *Staff*

Health and Physical Education

E. M. Cameron, *Director, Trinity College and College of Engineering* (109 Indoor Stadium, West Campus); Professor J. A. Friedrich, *Chairman, Health and Physical Education* (105 Card Gymnasium, West Campus)

First Term

PE 182. The Administration of Health and Physical Education in Secondary Schools. Presents the everyday problems that arise in the experience of the teacher of health and physical education. Open to juniors and seniors. 11:00-12:20. 3 s.h. *Davis*

PE 190. Protective Practices in Physical Education. Training and conditioning of athletic teams and the prevention, diagnosis, and treatment of athletic injuries. Gymnasium. 7:40-9:00. 3 s.h. *Davis*

History

Professor Richard L. Watson, Jr., *Chairman* (235 Allen Building, West Campus); Professor Harold T. Parker, *Director of Graduate Studies* (232 Allen Building, West Campus)

For admission to candidacy for a Master's degree in History, the student must present a total of twelve semester hours of prior work in History, of

which at least six must be in American History if he plans to take his major work in that field. Candidates for the degrees of Master of Arts and Master of Arts in Teaching are required to complete at least three hours of seminar work and are strongly urged to enroll for this work in the second term of their attendance in the Summer Session. (See courses numbered 300 or above.)

First Term

51. Modern History, 1500-1851. The central fact of the expansion of Europe underlies the content of the course. The chief themes are: the contest between liberty and authority in the modern state, changing economic theory and organization and the problems of peace and war among the states, including the Western infiltration of Asia, Latin America and Africa, and the rise of the United States as a world power. 7:40-9:00. 3 s.h. *Krantz*

91. The Development of American Democracy to 1865. This course is a study of trends vital to an understanding of the United States today. The main theme is the development of American democracy. Problems of foreign policy, the growth of capitalism, political practices, social behavior, and conflicting ideals are considered in relation to this main theme. 7:40-9:00. 3 s.h. *Robert*

141. Modernization in China and Japan. A history of the response of China and Japan to the West between 1750 and 1911, with some attention to their cultural background. 9:20-10:40. 3 s.h. *Gillin*

214. The Old South, 1800-1860. A study of political, economic, social, and cultural developments in the cotton and tobacco kingdoms. 11:00-12:20. 3 s.h. *Robert*

252. Recent European History: Europe Between the Wars, 1919-1939. Totalitarianism in Russia, Italy, and Germany; liberal France and England in difficulties; the disintegration of the peace. 9:20-10:40. 3 s.h. *Beachey*

289. Nationalism and Communism in Modern China and Japan. The growth of Nationalism in China and Japan, culminating in Japan's invasion of China and the subsequent rise to power of the Chinese Communists. 7:40-9:00. 3 s.h. *Gillin*

301. Seminar in Historical Investigation. A course designed to introduce teachers, current and prospective, to the processes of historical research through investigation of particular instances. The topics selected for investigation vary with the needs and interests of each individual. 1:40-3:00 or at an hour to be arranged. 3 s.h. *Ferguson*

Second Term

52. Modern History, 1851-1966. A continuation of History 51. 7:40-9:00. 3 s.h. *Staff*

92. *The Development of American Democracy, 1865 to the Present.*

The emphasis is on the emergence of contemporary problems. 7:40-9:00. 3 s.h. *Gatewood*

136. *Europe Since 1945.* The course of European history since World War II, with emphasis on the Cold War, the new governments, and new social and cultural patterns. 9:20-10:40. 3 s.h. *Beck*

205. *The United States in the Twentieth Century.* The major political, social and economic developments in the United States from 1901 to 1928, with emphasis upon the Progressive movement, World War I, and post-war reaction. 11:00-12:20. 3 s.h. *Gatewood*

218. *European Diplomacy Since 1919.* The Paris Peace Conference, diplomacy of the 1920's, the background of World War II, diplomacy of the Second World War and the Cold War. 7:40-9:00. 3 s.h. *Beck*

299. *East African History.* The establishment of European empires during the nineteenth century, the problem of imperial rule, the rising discontent of native peoples, and the new states. 9:20-10:40. 3 s.h. *Beachey*

302. *Seminar in Historical Investigation.* See description of 301. 1:40-3:00 or at an hour to be arranged. 3 s.h. *Watson*

Hospital Administration

Second Term

201. *History and Development of Hospitals and Other Health Agencies.* This course is designed to give the student a broad concept of the health field. It includes a study of the evolution of health institutions; analysis of medical care organizations in the United States; the emergence of the health professions. Permission of the instructor required. 3 s.h. *Smith*

Mathematics

Professor J. J. Gergen, *Chairman* (134 Physics Building, West Campus); Professor Seth L. Warner, *Director of Graduate Studies* (227 Physics Building, West Campus)

Graduate students are invited to consult with the Director of Graduate Studies concerning their programs.

First Term

21. *Introductory Calculus.* Rectangular coordinates, functions, graphs,

derivatives, maxima and minima, indefinite integrals, areas. Prerequisite: two and one-half units of college preparatory mathematics. 9:20-10:40. 3 s.h. *Kitchen*

64. Intermediate Calculus. Infinite series, vectors, and solid analytic geometry, partial derivatives, multiple integrals, introduction to ordinary differential equations. Prerequisite: Mathematics 63. NOTE: This is a three-week course beginning June 21. 7:40-9:00 and 11:00-12:20. 3 s.h. *Scoville*

224. Statistics. Elements of mathematical statistics, including a study of probability theory, empirical and theoretical distributions, correlation and regression, sampling, curve fitting. 9:20-10:40. 3 s.h. *Bryson*

231. Elementary Differential Equations. Solution of differential equations of elementary types. Prerequisite: Calculus. 11:00-12:20. 3 s.h. *Smith*

Second Term

22. Introductory Calculus. Application of the definite integral to distance, volume, length, area of surface of revolution moments, centroids, integration. Prerequisite: Mathematics 21. 9:20-10:40. 3 s.h. *Kitchen*

Mathematics and Science Institute

Only persons who are regular participants in the Summer Science and Mathematics Institute are eligible for these courses, except by special permission from the Director of the Institute.

Botany 214. Survey of Modern Botany II. 3 units (graduate).

Zoology 205. Zoology for Teachers. 3 units (graduate).

Botany 235. Introduction to Field Botany. 3 units (graduate).

Botany 236. Field Botany. 3 units (graduate).

Zoology 225. Introduction to Field Zoology. 3 units (graduate).

Zoology 226. Field Zoology. 3 units (graduate).

Chemistry 1. Inorganic Chemistry with Mathematics Refresher. (non-credit).

Chemistry 206. Elements of Theoretical Chemistry. 4 units (graduate).

Chemistry 251. Qualitative Organic Analysis. 3 units (graduate).

Mathematics 21, 22. Introductory Calculus. 6 units (undergraduate)

Mathematics 63. Intermediate Calculus. 3 units (undergraduate).

Mathematics 204. Elementary Geometry from an Advanced Standpoint. 3 units (graduate).

Mathematics 215. Intermediate Analysis. 3 units (graduate).

Mathematics 224. Statistics. 3 units (graduate).

Physics 41. General Physics with Mathematics Refresher. (non-credit)

Physics 231, 232. Physics for Teachers. 6 units (graduate).

Mycology

325. Medical Mycology. A lecture and laboratory course with emphasis on those fungi which cause disease in man and animals. The course includes practical laboratory work with materials from patients in Duke Hospital and those sent to the Duke Fungus Registry from outside sources. July 5-31. Lecture daily (Monday-Saturday), 8:00-9:00 a.m.; laboratory (Monday-Friday), 9:00-12:00 and 1:30-4:30 p.m.; Saturday 9:00-12:00. 4 s.h. *Conant*

Nursing

This course is open to Nursing students only, except by special permission from the Dean of the School of Nursing.

N 180. Public Health Sciences.

Philosophy

Professor Paul Welsh, *Acting Chairman and Director of Graduate Studies* (212 West Duke Building, East Campus)

First Term

42. Knowledge, Fact, and Value. An introduction to philosophy through the study of some of its main problems. These include the nature and ground of values, ultimate goals, and moral obligation. 9:20-10:40. 3 s.h. *Welsh*

48. Logic. A study of the conditions of effective thinking and clear communication. Examination of the basic principles of deductive reasoning. 11:00-12:20. 3 s.h. *Welsh*

Second Term

41. Knowledge, Fact, and Value. An introduction to philosophy through the study of some of its main problems. These include, the nature of truth and fact, of evidence, faith and knowledge, and of the fundamental categories descriptive of the universe. 9:20-10:40. 3 s.h. *Rosthal*

94. History of Philosophy: Ancient and Modern. An introduction to philosophy through the study of some of the major writings of the modern philosophers through Kant. (Open to freshmen with a B average.) 11:00-12:20. 3 s.h. *Rosthal*

Physics

Professor Henry A. Fairbank, *Chairman* (119 Physics Building, West Campus)

Classes in Physics 41, Term I, will begin on June 21 and continue through July 18. Classes in Physics 42, Term II, will begin on July 21 and continue through August 17. Students who wish to avoid paying a late registration fee must have their registration completed in advance of these dates. For registration dates see *General Registration* on page 25 of this *Bulletin*. (Physics classes will not meet on Saturdays.)

First Term

41. General Physics. This course treats the basic principles of general physics in a more quantitative manner than Physics 1-2. It meets in a thorough way the physics requirement for entrance into the study of either medicine or engineering, and is well suited for the general science student. This course is not open for credit for students who have completed Physics 1-2. Lecture and recitation daily, 8:30-9:50 and 10:10-11:30; laboratory four days per week, 1:00-4:00. Prerequisites: Mathematics 21, 22 or equivalent. 4 s.h. *Bowers and Carpenter*

353X. Thesis Seminar. Students who are properly qualified may carry on research work under direction. Credits and hours to be arranged. *Staff*

Second Term

42. General Physics. A continuation of Physics 41. Prerequisite: Physics 41. Lecture and recitation daily, 8:30-9:50 and 10:10-11:30; laboratory four days per week, 1:00-4:00. 4 s.h. *Bowers and Carpenter*

Political Science

Professor John H. Hallowell, *Chairman* (307 Library, West Campus); Associate Professor Jesse Harris Proctor, *Director of Graduate Studies* (306 Library, West Campus); Professor Hugh M. Hall, *Director of Undergraduate Studies* (315 Library, West Campus)

First Term

61. The American Political System. An analysis of the principles and institutions of government and politics in the United States. 11:00-12:20 3 s.h. *Simpson*

125. American Political Parties and Practical Politics. A study of the

historical development, organization, and methods of political parties in the United States. 7:40-9:00. 3 s.h. *Simpson*

Second Term

62. Comparative Political Systems. An analysis of the principles and institutions of selected foreign governments, as compared with those of the United States. 11:00-12:20. 3 s.h. *Dallmayr*

225. Comparative Government and Politics. A comparative study of modern political institutions and processes with particular attention to European constitutional government and politics. 9:20-10:40. 3 s.h. *Dallmayr*

Psychology

Professor Irving E. Alexander, *Acting Chairman* (240 Building 9, West Campus); Professor Norman Guttman, *Director of Graduate Studies* (103 Building 9, West Campus)

Details concerning the program in studies in Psychology may be obtained from the Director of Graduate Studies in Psychology.

First Term

91. Introductory Psychology. An introduction to the facts, principles, and problems of psychology through a study of motivation, emotions, perception, sensation, thinking, memory, learning, social behavior, individual differences, and personality. 7:40-9:00. 3 s.h. *Guttman*

211. The Problem Child (Also Education 211). Study of problem behavior and adjustment in children with emphasis on the causes and treatment of conduct and neurotic disorders of the maladjusted child. Particular attention will be paid to mental hygiene principles in the handling of problem children in school and home. 9:20-10:40. 3 s.h. *I. Gehman*

232. Personality and Physical Handicap. Survey of the psychological factors underlying adjustment to physical disabilities, with particular stress upon personality, emotional and social attributes. Selected case studies will be used to illustrate the integration of such factors in adjusting to home, school, and hospital settings. These cases will stress the psychological factors which hinder learning and retraining procedures. Discussion will center about psychological techniques to produce more effective progress in rehabilitation. 7:40-9:00. 3 s.h. *Huse*

303. Research. Students who are properly qualified may carry on research work under direction. Hours and credits to be arranged. *Staff*

Second Term

100. *Personality.* Representative theories of personality, from Freud to the present, emphasizing problems of normal personality structure, dynamics, development, and assessment. 9:20-10:40. 3 s.h. *Carson*

304. *Research.* Students who are properly qualified may carry on research work under direction. Hours and credits to be arranged. *Staff*

Religion

Professor Robert E. Cushman, *Dean of the Divinity School* (124 Divinity School, West Campus); Associate Professor Barney L. Jones, *Acting Chairman of the Department of Religion* (117 Gray, West Campus); Associate Professor James H. Phillips, *Director of Undergraduate Studies in Religion* (117 Gray, West Campus); Professor Waldo Beach, *Director of Graduate Studies in Religion* (209 Divinity School, West Campus)

The Department of Religion

First Term

51. *The English Bible.* A survey of the Old Testament, similar to Religion 1 but adapted to the capabilities of sophomores, juniors, and seniors. Not open to freshmen, or to students who have received credit for Religion 1. 7:40-9:00. 3 s.h. *Jones*

55. *The Religion of the Bible.* An introduction to the historical and critical study of the Old and New Testaments, which considers the principal persons, events, ideas, and practices contained in the Biblical record, and their significance for the present time. Not open to freshmen, or to students who have received credit for Religion 1-2 or 51-52. 9:20-10:40. 3 s.h. *Osborn*

131. *History of Christianity from the Early Church Through the Reformation.* A study of events, trends, personalities, and interpretations that have shaped Christianity from the time of the early Church through the sixteenth century, intended to acquaint the student with the Christian heritage and to contribute to his understanding of contemporary Christianity. 9:20-10:40. 3 s.h. *Fousek*

149. *Current Interpretations of Christianity.* Contemporary types of Christian thought as seen through the writings of such leading representatives as Karl Barth, John Baillie, Paul Tillich, and Reinhold Niebuhr. 11:00-12:20. 3 s.h. *Osborn*

Second Term

52. *The English Bible.* A survey of the New Testament, similar to Re-

ligion 2 but adapted to the capabilities of sophomores, juniors, and seniors. Not open to freshmen, or to students who have received credit for Religion 2. 7:40-9:00. 3 s.h. *Jones*

93. *Survey of the World's Living Religions.* An introductory course designed to acquaint the student with the problems and methods of the study of world religions. After a brief consideration of religion in primitive culture, the world's living religions are dealt with in terms of historical development and beliefs, practices, and contemporary importance of each. Prerequisite: Religion 55 or equivalent. 9:20-10:40. 3 s.h. *Bradley*

176. *World Religions and Social Change.* Religious traditions and institutions in national and international affairs. Intensive study of selected areas of Asia and Africa with special stress on missionary religions and political change. 11:00-12:20. 3 s.h. *Bradley*

The Divinity School

Class enrollments will be controlled as occasion may arise so as to secure a fairly even distribution among the courses offered in each term.

First Term

105 (DS). *Studies in Paul.* An investigation of Paul's apostolate based upon the Acts and the Epistles with attention to Paul's theology as reflected in selected passages. 9:20-10:40. 3 s.h. *Efrd*

114 (DS). *Christian Social Ethics.* The principles of Christian social policy with reference to domestic, social, political, and economic patterns of contemporary culture. 7:40-9:00. 3 s.h. *Smith*

320 (DS). *Seminar: Friedrich Schleiermacher.* Critical examination of the dogmatic system. Prerequisite: C. T. 322. 11:00-12:20. 3 s.h. *Herzog*

Second Term

102 (DS). *Christian Apologetics and Modern World Views.* A constructive approach to the Hebrew-Christian understanding of Creator and creature in the light of contemporary scientific knowledge. 11:00-12:20. 3 s.h. *Robinson*

170 (DS). *Introduction to Pastoral Counseling.* The philosophy and techniques of formal counseling through discussions of textual and interview material. Prerequisite: P. C. 26. 9:20-10:40. 3 s.h. *Williamson*

Romance Languages

Professor John Fein, *Chairman* (205 Building 5, West Campus)

French

First Term

1. Elementary French. Introduction to understanding, speaking, and writing French. Audio-lingual techniques are combined with required recording-listening practice in the language laboratory. 7:40-9:00 and Mondays and Thursdays 2:00-3:20. 4 s.h. *Béron*

63. Intermediate French. Intensive classroom and laboratory practice in spoken and written patterns. Readings in contemporary literature. Prerequisite: French 1-2 or two years of high-school French. 7:40-9:00 and Mondays and Thursdays 2:00-3:20. 4 s.h. *Foy*

Second Term

2. Elementary French. Continuation of 1. 7:40-9:00 and Mondays and Thursdays 2:00-3:20. 4 s.h. *Stamelman*

64. Intermediate French. Continuation of 63. 7:40-9:00 and Mondays and Thursdays 2:00-3:20. 4 s.h. *Hogsett*

211. Approaches to Romance Literature. An introduction to the most significant ways in which Romance literature has been divided and studied, with analyses of selected texts. 9:20-10:40. 3 s.h. *Cherpack*

218. The Teaching of Romance Languages. Evaluation of objectives and methods; a study of the practical problems involved in teaching these languages on the elementary, secondary, and college levels; analysis of textbooks, special foreign language programs, audio-visual aids; critical examination of modern techniques in written and oral testing. 7:40-9:00. 3 s.h. *Dow*

Spanish

First Term

1. Elementary Spanish. Introduction to understanding, speaking, and writing Spanish. Audio-lingual techniques are combined with required recording-listening practice in the language laboratory. 7:40-9:00 and Mondays and Thursdays 2:00-3:20. 4 s.h. *Sieber*

63. Intermediate Spanish. Intensive classroom and laboratory practice in spoken and written patterns. Readings in contemporary literature. Prerequisite: Spanish 1-2 or two years of high-school Spanish. 7:40-9:00 and Mondays and Thursdays 2:00-3:20. 4 s.h. *Daniel*

Second Term

2. Elementary Spanish. Continuation of 1. 7:40-9:00 and Mondays and Thursdays 2:00-3:20. 4 s.h. *Glenn*

64. Intermediate Spanish. Continuation of 63. 7:40-9:00 and Mondays and Thursdays 2:00-3:20. 4 s.h. *Battle*

Sociology and Anthropology

Professor John C. McKinney, *Chairman* (268 Building 9, West Campus); Professor George L. Maddox, *Director of Graduate Studies* (268 Building 9, West Campus)

The Department of Sociology offers graduate work leading to the A.M. and Ph.D. degrees. Before undertaking advanced work in this Department, a student must have completed a minimum of twelve semester hours of approved preliminary courses in the field, and twelve additional semester hours in the field or in related work. A student who is deficient in the minimum required work will be asked to take additional undergraduate courses agreed upon in conference with the Director of Graduate Studies.

Candidates for advanced degrees in Sociology usually take minor work in Psychology, Economics, Political Science, Education, History, or Religion. Detailed requirements for the minor work, and for majors in other departments who wish to present Sociology as minor work, may be obtained from the Director of Graduate Studies.

First Term

91. Introduction to Sociology: Concepts and Procedures. Concepts and procedures of sociology and illustrations of their use in understanding specific areas of social life. Open to freshmen. 11:00-12:20. 3 s.h. *George*

153. Sociology of the South. The developing regional organization of the world economy studies with especial reference to Southern life. A survey of the composition and distribution of population, races and race relations. Primary emphasis is upon social change. 9:20-10:40. 3 s.h. *Thompson*

253. Social Institutions. The study of particular institutions and the social movements out of which they developed, with emphasis on the development of general propositions concerning the nature, function, and importance of institutions in society. 11:00-12:20. 3 s.h. *Thompson*

Second Term

92. Introduction to Sociology: Sociological Studies. Application of theories and methods of sociology through an examination of several empirical studies dealing with various aspects of social behavior. 11:00-12:20. 3 s.h. *Roth*

241. Social Stratification. The nature of hierarchical and vertical differentiation in the political and prestige structures in modern societies. The interrelationship of class, status, and power strata and their influence on social institutions, personality structure, and group and individual behavior. 9:20-10:40. 3 s.h. *Burgess*

255. Race and Culture. A comparative study of race relations in world perspective developed around such themes as races and personal identity, the geography and ecology of race relations, the idea of race, and race conflict. 11:00-12:20. 3 s.h. *Burgess*

Zoology

Professor Edward C. Horn, *Chairman* (227 Biological Sciences Building, West Campus); Associate Professor D. A. Livingstone, *Director of Graduate Studies* (043 Biological Sciences Building, West Campus)

All classes in Zoology are offered at the Duke University Marine Laboratory at Beaufort, North Carolina (Term I, June 13-July 18; Term II, July 20-August 24). Students who wish to avoid paying a late registration fee must have their registration completed in advance of these dates. For registration dates see *General Registration* page 25 of this *Bulletin*. For detailed instructions and further information on these offerings see the *Bulletin* of Duke University Marine Laboratory.

To undertake study toward an advanced degree in Zoology, a student should have completed an undergraduate major in Zoology or its equivalent. This normally amounts to twenty-four or more hours of course work distributed among various fields of Zoology. The Department recognizes the trend in modern biology towards interdisciplinary research, and part of the Zoology requirements may be replaced by advanced work in Chemistry, Mathematics, Physics, etc.

Required work for the A.M. degree ordinarily includes twelve units of advanced course work in Zoology, six units of course work in a minor department, and an additional six units of advanced course work in the major or minor department, or in other pertinent departments. Furthermore, an acceptable thesis is necessary for the fulfillment of the degree requirements.

Candidates for the Ph.D. degree are expected to be broadly trained zoologists. The program of each candidate is determined by a committee which reviews previous training and sets the specific requirements to be made. Normally the program includes graduate courses in several fields of Zoology, courses in the minor subject, wide reading in science in general and in biology in particular, research, and dissertation based on original work. Minor work is available in many fields, including Anatomy, Biochemistry, Botany, Chemistry, Physics, Physiology and Psychology.

First Term (Duke Campus)

353. *Research.* Hours to be arranged. 2-6 s.h. *Staff*

First Term (Duke Marine Laboratory)

203 (Beaufort). *Marine Ecology.* A study of marine animals in relation to environment. Consideration of environmental factors, succession, rhythms, communities, intraspecific and interspecific relations, productivity, conservation problems, etc., concerned with animal life in the ocean. Lectures, reviews, conferences, field and laboratory work. 6 s.h. *Gray*

215 (Beaufort). *General Physical and Chemical Oceanography.* Relief of the ocean floor; physical and chemical properties of sea water; distribution of temperature, salinity, and density; heat budget; sea ice; light; ocean currents, waves and tides; selected topics of regional oceanography. Field work, processing and analyzing of routine oceanographical data, solving problems and interpretation of results. Prerequisites: One year of Physics and Chemistry, Mathematics through Calculus. 6 s.h. *Stefansson*

250 (Beaufort). *Physiological Ecology of Marine Animals.* A study of the physiological responses of marine animals in relation to certain environmental factors and evolution. Animals representing numerous phyla and from various habitats are studied. Prerequisite: Zoology 151 or equivalent. 6 s.h. *Vernberg*

353. *Research.* Hours to be arranged. 2-6 s.h. *Staff*

Second Term (Duke Campus)

354. *Research.* Hours to be arranged. 2-6 s.h. *Staff*

Second Term (Duke Marine Laboratory)

274 (Beaufort). *Marine Invertebrate Zoology.* A study of invertebrate animals that occur in the Beaufort region. A number of field trips will be made to a variety of habitats to study, collect, and classify animals in their natural environment. The structure and habits of living invertebrates, as well as their behavior under certain experimental conditions, will be studied in the laboratory. 6 s.h. *Barnes*

354. *Research.* Hours to be arranged. 2-6 s.h. *Staff*



Appendix





Degrees and Honors

The following degrees were awarded June 6, 1966:

Bachelor of Arts

Brenda Lee Abercrombie
Roy F. Abernethy, Jr.
William Umstead Albright, Jr.
Bruce J. Alexander
James Patrick Alexander
Philip H. Allen, Jr.
Charles Frederick Altman
Christina Sifers Alvarez
William Jan Alvarez
Karen Sue Amen
Marilyn Ruth Andersen
Marjorie Clare Anderson
William Eugene Anderson
Robert Dunten Andrews
Timothy Eagan Anna
Bonnie Gail Apgar
Charlton Preston Armstrong, III
Andrew William Ash
Dianne Avery
Dorothy Brock Aydlett
Michael Edward Backus
Susan Rebecca Bailey
Sarah Louise Baker
William Hale Baker
Jeanne Elizabeth Bannerman
Drayton West Barbare
Edgar Wilson Barksdale, Jr.
Richard Smith Barlow
Pamela Sue Barnes
David Lee Porter Baswell
Thomas William Baxter
Susan Winfield Bayles
Alan Dodge Beck
Betsy Lee Beineke

Alexander Wayne Bell
Barbara Lynn Bell
Linda Kay Bemis
James A. Bendon
Harry Robinson Benner
Jo Benson
Stefan David Berg
Kristine Bergelin
Jerry Charles Bernstein
Robert Chambliss Berson, Jr.
John Roger Bertsch
Harold Dean Billings
J. Wayne Birkel
Douglas Knowles Bischoff
Lloyd Hall Black, Jr.
Sally Anne Blackwell
John Treleaven Blakely
James Bedford Blitch, Jr.
Sidney Milton Blitzer, Jr.
Lynn J. Bloemeke
Elaine Jude Bloomer
Michael William Boehm
Lucy Bishopric Bolch
Kermit Rex Booher, Jr.
Leslie Rae Boone
John Martin Boop
Judyth Elayne Booth
William F. Borgmann, Jr.
James Murray Boughton
Brian Edward Bovard
Susan Belvin Bowers
Frank Lee Bowman
Mary Stowe Boyd
Barry B. Boyer

Samuel Mauney Bradley
 Moniea Marie Brady
 Claire Joy Braibanti
 Mary Kathryn Brigmon
 Thomas Pittman Brim
 Margo Ann Brinton
 Linda Wyatt Brown
 Timothy Scott Brown
 Kenneth Richard Brownstein
 John Douglas Broyles
 James William Bruce
 Sharon M. Brucker
 Michael Lee Bryant
 George Stephen Buck
 Barbara Greaves Buckman
 John Eugene Bugg
 Charlotte Anne Bunch
 Sue Ann Bunek
 Robert John Burgstahler
 John Gordon Burns, Jr.
 Stanley Theodore Burns
 Maribeth Byers
 Thomas Burwell Byers
 Mark Jeffrey Caldwell
 John Lawrence Campbell
 Stephen Edward Campbell
 Joan Frances Carew
 Catherine Jane Carlile
 John Wakeman Carlo
 Cynthia Dean Carlton
 Eugene J. Carney, Jr.
 Thomas Sheridan Carpenter
 Carolyn Elizabeth Carruth
 Robert Bruce Carruthers
 Edith Jane Carson
 Rilla Louise Carter
 James Byron Carty, Jr.
 Brent Eugene Causey
 Dorothy Squir. s Chalk
 Christine Chamberlain
 Walton Ford Chapman
 John Simmons Cheetwood
 Carol Anne Christy
 Kenneth Paul Clark
 William Bernhard Clatanoff, Jr.
 James Hill Clay, Jr.
 Janet Arlene Cline
 Samuel D. Clyde, III
 Carol Ann Coburn
 Carl Van Martin Coffin
 Theodore Hamilton Coleman, Jr.
 Robert Gerard Collins
 Joseph Albert Comfort, Jr.
 Talitha Nute Conant

Arthur Read Cone, III
 Lide Taylor Cooke
 Richard A. Cooper
 Susan Elizabeth Cooper
 Cathy J. Copley
 Ann Carroll Coulter
 Leonard Hoyle Craver, Jr.
 Jay Stanley Creswell, Jr.
 Carole Anne Crumley
 Philip Hugh Wallace Crump
 Bryan Patterson Crutcher
 Penny Cuninggim
 Marianne Suzie Cunningham
 James Michael Curtis
 Diana Sayre Dalton
 Dorothy Houston Daniel
 Mary Fay Danner
 Martha Lou Dantzler
 Carolyn Ross Darden
 James Purnell Davenport
 Richard Drake Davenport
 Leslie La Verne Davidson
 Douglas Edward Davis
 Kenneth Owen Decko
 Nancy Dees
 Nancy Gayle Dillard
 John Kane Ditto, Jr.
 Kemper Harlan Dodson, III
 Susan Emily Doerner
 Stephanie Peach Doetsch
 Michael A. Douglass
 William LeRoy Dowdy, III
 Louise Helen Dowling
 Arthur Spurgeon Drake
 William Franklin Drew, Jr.
 Charles Richard Drulis
 Lois Couch Dumas
 Jeffrey David Dunn
 Paul Clinton Echols
 Donald Kenneth Edgerton
 David Joel Edwards
 Victoria Jean Ekvall
 Jaret Gay Elbert
 Martha Candice Elfen
 James Vernon Elliott
 Russell Wesley Engle
 Reid Hart Ervin
 Edith Vineent Evans
 Sara Margaret Evans
 Anne Christian Everhart
 Mary Fairbank
 David J. Falcione
 Elizabeth Owen Falk
 Mark B. Farber

Wayne Richard Fay
 Geoffrey Max Fenstermacher
 Gary Steven Fentin
 James M. Ferguson, III
 Katherine Ann Fiaccone
 Glenn Dixon Fields, Jr.
 Harriet Fillmore
 Sanford Burton Fitts, III
 Donald Randolph Fleck
 Robert Fuller Fleming
 Sue Black Forbes
 Hoyt Stanley Ford
 Paul Taber Forth, Jr.
 Sam Leon Foushee, Jr.
 James Thomas Fowler, III
 Griffith William Foxley
 Alan Howard Frank
 John R. Freeman
 Millard Phillip Freeman
 Ann Hall Freiberg
 Beckwith Lee Fuller
 Judith Anne Futch
 Sally Slater Gabb
 Howard R. Gabennesch
 Denise Galant
 Ronald Monroe Gates
 George Edward Gibbs
 John Louis Giering
 Ripple Erskine Gilbert
 Terry Scott Gilbert
 William Fenn Giles, II
 Cynthia Ann Gilliatt
 Lynn Thomas Gillman
 Nancy Lassiter Githens
 Sarah Lane Goddard
 Jean Lee Godfrey
 Philip William Gold
 Rebecca Huntley Gordon
 Thomas Frederick Gordon, Jr.
 Margaret Elizabeth Gragg
 Philip Lawrence Graitcer
 Virginia L. Greene
 Phyllis Kent Greenwood
 William Hunt Gross
 Eric William Gustafson
 Richard Young Guthrie
 Thomas Sawyer Hackett
 Edward June Hackney, Jr.
 Peggy Jolene Spivey Hackney
 Arthur Howard Haigh, III
 Margaret Bower Haines
 Betty Bradley Haley
 Evelyn Braden Hammond
 Stevan Terrell Hanna

Marvin Ormond Hardin
 Robert Gerald Hardy
 Perry Grant Harmon, Jr.
 Margaret Lynn Harned
 Kent Michael Harrington
 Nathan Michael David Harris
 Fenton F. Harrison, Jr.
 Russell Sage Harrison, Jr.
 Kathryn Alice Harry
 Barbara Jane Haskett
 Gordon Abert Hasse, Jr.
 Stephen Drake Haverick
 Howard Clinton Hay
 Lorene Douglas Hebble
 Wilson Drew Heitzenrater
 Judith Bea Hellekson
 Julian Dean Heller
 Richard S. Helstein, II
 Kristine McCarty Hemphill
 William Holt Heritage, Jr.
 John Willis Herron
 Jeremy Joan Hewes
 Mical Barbara Heyman
 Scot George Hickman
 William Patterson Hight
 Elizabeth Anne Hiley
 Carolyn Grim Hill
 Charles Alfred Hill, Jr.
 Dan Winfield Hill, III
 Mary Christine Hoelle
 John Fleming Holder
 Frances Lynn Holmes
 Jill Robie Holmquist
 Edwin Nicolaides Homer
 Elizabeth Kinard Hooker
 David Harold Hopkins
 Jean Ellen Hoppe
 Elizabeth Ann Horton
 Deryl Johnson Howard
 Roy Davis Howser, III
 Frank Jackson Huffman, Jr.
 William Clarence Hufford
 Terry Runals Hughes
 Gaye Humpton
 William Gray Huston
 Thomas Allen Hutcheson
 Charles Patrick Hybarger
 Judy Faye Hyder
 Allen W. Imershein
 Ann Ince
 Frank Wilson Ingle
 John Edgar Ingram, Jr.
 James Russell Innis
 Jay William Jackson

Mardi Lee Jacobsen
 Robert Leslie James
 Louise Jaquette
 John Henry Jarman, III
 Dexter Lee Jeffords
 James Jay Jenkins
 Bruce Harold Johnson
 Clifford Ross Johnson
 David Moise Johnson
 Judith Harris Johnson
 Michael Elliott Johnson
 Sharon Anne Johnson
 Douglas Lamar Jones
 Edwin Lee Jones, III
 Margaret Carnwath Jones
 Charleene Lance Jordan
 William Jennings Jordan, Jr.
 Charles Dickson Joynes
 Richard Bevins Kale, Jr.
 F. Frederick Kaufhold
 John Pearse Kaufman
 Blair Allen Keagy
 Samuel John Keith
 Robert Jeremiah Keller
 Andrew Franklin Kelley, Jr.
 Karen Marshall Kelley
 Mary Lynn Kelso
 Louise Brown Kennedy
 William Ellis Kennedy, Jr.
 Leonore Kerz
 David Hastings King
 Thomas Roberts Kinney
 Sarah Howe Kirby-Smith
 John Liveright Koch
 Dianne Komminsk
 Karen Taliaferro Kovac
 Frederick George Kroncke, Jr.
 Philip Patrick Lader
 Katharine Northern Land
 Charles Larsen, III
 Eleese Covington Latimer
 Dennis Allan La Via
 David Hardman Lawson
 Mary Patricia Lawver
 Joan Karen LeCraft
 Linda Allison Leftwich
 Jean Elizabeth LeGwin
 Beatrice Walker Lenz
 Leigh David Lerner
 Claire Brandt Levenson
 Jane Rue Levine
 Jean Frances Lewis
 Jeffrey Edward Lewis
 Myron Roy Lichty

Todd Michael Lieber
 Frank G. Light, Jr.
 Edward Stovall Ligon
 Walter Hill Lindsay, Jr.
 Martha A. Lockhart
 Nancy Tucker Lockhart
 Alan Wilmot Losee
 Thomas Aiken Low
 Torry Lowenbach
 Andrew John Lucas
 Joy Elin Ludwigsen
 Karen Muriel Lundry
 Rodney Hammond Lusk
 Susan Wendy Lyle
 Donald Michael Lynch
 Ann Wilkie MacLean
 Mary Janet Macomber
 Frederick Tice Mahla
 John E. Mahoney, Jr.
 Kathleen Pendleton Malley
 Margaret Ann Malone
 Donald Owen Manning
 John Warren Marin
 Mary Ann Marks
 Marianna Marshall
 Edwin Lindsay Marston, Jr.
 Nancy Mason Martin
 Louise Ann Mathews
 Cynthia Mathis
 Walter Sidney Matthews, III
 Albert C. Matuza, Jr.
 Marilyn May
 Elizabeth Jean Mayo
 Elizabeth Ellen McComb
 Robert Hodge McCreary
 Dorothy Ellen McDougale
 William Harold McKee
 John Thomas McNabb, II
 William John McNally, III
 William Vann McPherson, Jr.
 Caryn Lynne McTighe
 Dianne Joyce Mendenhall
 Michael James Menne
 Sara Hammock Middlebrooks
 John Blair Miles
 Joan Jackson Miller
 John Cleveland Hays Miller, Jr.
 Susan Lee Mitchell
 Frank Mackenzie Mock
 Susan Esther Moger
 Jane Wise Montgomery
 Susan Caroline Moore
 Thaddeus David Moore
 William Bryan Moore

Edith Morales	Frederick Purnell, Jr.
Charles Eugene Morgan	David Stewart Randall, Jr.
Nancy Darling Morgan	Alice Mansfield Rankin
John Gideon Morris, Jr.	Rosalie Annette Rankin
Robert Frederick Morris	Carolyn LeNora Ray
John Broten Morton	Diane Joan Reback
Sara Frances Moss	Sara Kathryn Reeves
John D. Moxley, Jr.	Jerilyn Gloria Reuter
Harry Murphy Murray, Jr.	Benoni Orrin Reynolds, v
Thomas A. Newby, Jr.	John Charles Reynolds
Howard Newmark	Susan V. Reynolds
Carol Anne Newsome	Carol Ann Rice
Barbara Carolyn Nichols	David Preston Richardson
Christine Nicoll	Martha Lucille Ritter
Harry Abraham Nurkin	James H. Robertson
Richard Alva Nye	Steven Geoffrey Rodin
Eileen Theresa O'Connor	Susan Kay Rodrian
David Stanley Odom	Myra Stewart Rogers
Samuel Marshall Orr, III	Walter Gary Romp
Richard G. Osmun	Emily Rebecca Roper
Anthony Oyewole	Suzanne Elizabeth Rowland
Robert Foster Page	Carol Jean Roznoy
John Albert Palmer, Jr.	John Jesse Rudin, III
Donald Oscar Parsons	Judith Anne Rudolf
Teresa Ann Patch	Daniel Robert Rupp
David Drake Patton	Michael Claude Russ
Vicky Lee Patton	Jill Hudson Salinger
Lura Rudisill Payne	Robert Holmes Sapp
Benjamin S. Peck	Paul Michael Schlosser
Charles William Pennington	Dennis Robert Schumer
Clifford Webster Perry, Jr.	Elisabeth Carolyn Scott
William Mason Pew	Julia Ann Scott
Rickard Frank Pfizenmayer	Watson Terhune Scott
Diana Louise Pharr	Hillis Mairy Scribner
Janice Lynne Philbrick	Stephen James Selden
Elisabeth Leigh Phillips	Michael Marvin Self
Glenn Patrick Phillips	Howard Clifton Sessoms
Katharine Allen Phillips	William Boyd Settlemyer
Roy Mangum Phipps, Jr.	James Hilliard Shackford
Mary Elizabeth Pickering	Christopher Patrick Sharp
Anne Caldwell Pickett	Maria Stewart Shaw
Daniel Goodwin Pierce	Elder Leconis Shearon, III
Peter Wood Pierce	Carolyn Louise Sherman
Patricia Prather Pineo	Thomas J. Sherrard, III
Ronald Clayton Pirtle	William Franklin Sherrill
Stephen Snyder Pixley	Carey Deane Shore
John Robert Poe, Jr.	Lucia Elisabeth Simpson
Raemon Maurice Polk	Larry Don Sims
James Lawrence Pollok	Timothy Anderson Sinclair
Mary Jane Potocki	Celia Roan Slaughter
Thomas C. Powell	Clyde Harold Slease, III
Richard Kirby Primm	Nancy Elizabeth Slocum
Marcia Joellyn Proctor	Carol Jane Smeltz
Louise Tupper Pruitt	Barbara Hamilton Smith

Brian Campbell Smith
 Carolyn Smith Smith
 Julie Anne Smith
 Robert Kinsey Smith
 Sarah Lynn Smith
 Elizabeth Birney Snow
 Mary Ann Snyder
 Mary Elizabeth Snyder
 William Robert Somers
 Samuel Ogburn Southern
 Herschel Evans Stanford, Jr.
 Margaret Judith Stanley
 Dale Guinn Stansbury
 Byron Eugene Starns, Jr.
 William Roy Stauffer
 Nancy White Stead
 Russell James Steib
 Barry Wade Stevens
 James Hervey Stevens, Jr.
 Lynn Baxter Stevens
 Michael Alan Stoner
 John Stephen Stoppelman
 Carol June Stover
 Sandra Patricia Stroupe
 Rowena Maxwell Stubbs
 Sara Margaret Stubbs
 Jon Woodford Stuebner
 Elizabeth Ann Sullivan
 George Ann Surbaugh
 Carol Blankenship Sweger
 John Gilbert Swinney, Jr.
 Nancy Penelope Tarwater
 Judith Ruth Tate
 Richard Keith Taylor
 William Ralph Taylor
 Janet Mills Thompson
 Thomas Spruill Thornton
 James Thomas Tilton
 Ethel Marion Tinsley
 Brenda Gay Todd
 David Joseph Tomko
 William Bernard Trexler
 John Douglas Truslow

George Robert Turner, III
 Suzanne Louise Turner
 Stephen T. Vacendak
 Paul Allen Vick
 Peter Vinten-Johansen
 Kirk Keyes VonSalzen
 Jonathan C. Waldron
 Daisy Powell Walston
 Julia McNeil Wanless
 William Ross Warfield
 David Michael Warner
 Roger Waters
 David Watson
 Susan Dale Watson
 Edward Richard Waxman
 Elizabeth Rose Weatherford
 Jean Watson Weatherspoon
 William Hardy Weatherspoon
 Lewis William Weinhardt, Jr.
 Kathleen Welfare
 Kenneth Lee Wertz
 Milton Lee West
 Ruth Tinsley West
 Robert Marshall White
 Sarah Noyes White
 Robert Benjamin Whitley
 Robert W. Widell
 Lorraine Vee Willert
 Alice June Williams
 Elizabeth Kemper Williams
 Frances Gay Williams
 Schuyler L. Williams
 Charles Edward Wilson
 H. Joseph Wise, III
 Carl Senning Wolter
 Ernest Elmer Wooden, III
 Eloise Caroline Woolley
 James Dixon Wright, Jr.
 Ola Rinda Wright
 Roberta Ann Wright
 Earl Wesley Yates
 Robert Young
 William Allen Zimmer

Bachelor of Science

Thais Edwina Ahrendt
 William Council Archie, Jr.
 Ingrid Dagmar Arnold
 Dolly Elizabeth Beacham
 Dennis Hawthorne Becker
 William Maurice Blackshear, Jr.
 Clyde Markell Bohn, Jr.
 William Johnston Boyle, Jr.

Ernest Loring Britton
 Mary Julia Champion
 Margaret Hays Chandler
 Stephen Gifford Chaney
 Carlyle Andrew Clayton
 Michael Edward Cohen
 Claudia Gail Conn
 Kathryn Harris Cook

Donald Kingsley Covington, III
 Helen Elizabeth Dezell
 William James Disotell
 Joan Christine Durana
 William Bradley Elliott
 Richard Harvey Emslie
 Janet Ellen Evans
 Bonnie Lee Fiedorek
 Barbara Nadine Fox
 Jack Leslie Gosnell, Jr.
 Carol Jean Goter
 Alma Sue Green
 Linda Belle Gregory
 David Lee Guth
 David William Harold
 Martha Cole Hervey
 David Caster Hoaglin
 James Marion Holbert, Jr.
 Susan Ellen Jones
 Sherry Ann Kellett
 Charles Stephen Knode
 Crawford Bryan Koon, Jr.
 Jerrold Ernest Kronenfeld
 Robert Neal Larsh
 Maybelle Fay Lee
 Harvie Huey Lewis
 Georgiandra Little
 Harriet Leanna Matthews
 Charles Hambly McDonald
 Alexander McPherson, Jr.

Zeb Brent Morgan
 Julian Victor Nadler
 Richard B. Newton
 Laurence H. Norby
 Linda Lee Nuzum
 Andrea Vivian Pandolfo
 William Otis Quesenberry, Jr.
 Elizabeth Ann Ramsey
 Harold Louis Rekate, Jr.
 Theodora R. Reyling
 James Timothy Robinson
 Rona Beth Sayetta
 Gustav Albert Schick
 William Bruce Simmons, Jr.
 Richard Hoy Snider, Jr.
 Martha Loraine Speck
 Robert Elihu Stauffer
 John David Sutherland
 Kent Dean Thackrey
 Joseph Madison Thompson
 Margaret Carolyn Tyler
 David Jennings VanLandingham, Jr.
 Janet Lancaster Warner
 Robert Clayton Wheland
 Betty Lynn Whisnant
 Henry Miles Wilbur
 Stephen James Wilson
 Dee Anne Woodard
 Donald Francis Young

Bachelor of Science in Civil Engineering

Robert Edward Ackerley
 James Loughry Ake
 Allan Nelson Bredenburg
 Nathanael Broker
 Thomas Richard Danluck
 Francis Daniels Farrell, Jr.
 David Thomas Hartgen
 Grady Thomas Helms
 Henry Thomas Lyons, Jr.

Frank Albert Manola
 Linwood Arnold McCullers
 James Frederick Page
 Cameron Wallace Penfield
 Robin David Grenfell Pyne
 Lucien Ruby
 Rodney Owen Stewart
 Craig Stevens Volland
 Samuel A. Walker, III

Bachelor of Science in Electrical Engineering

Oliver Alexander Bell, Jr.
 Peter William Blattner, Jr.
 Jeffrey Michael Brick
 Nicholas Brienza
 James Hoffert Brindle
 Charles Howard Cruse
 John Wallace Dowdee, III
 Thomas Richard Edgar
 Winston Gordon Fowler

Thomas Adrian Furness, III
 Thomas Einar Harrington
 James Richard Harvey
 Lester Hill
 William Dwight Jones
 Sidney Lloyd Kauffman, Jr.
 Michael Grant Madden
 Michael Randolph Manes
 Roger Bernard Midura

Wayne Hamilton Miller
 James Robert Moreng
 Larry Randell Norwood
 Nicholas Christy Pazuros, Jr.
 Randolph Kent Repass
 Robert Burks Ridenhour

Charles Henry Rogers
 Christopher Scott Stiles
 Richard Stanley Thomas
 Edward Claude Thompson
 Murray Henderson Woods

Bachelor of Science in Mechanical Engineering

Robert Nicely Armstrong
 Donald Horace Bellman, Jr.
 Robert E. Bergen
 Watts Tracy Estabrook, III
 John A. Foltz
 Richard Michael Furlong
 Harry Price Gray
 Judith Anne Grimes
 Harold Glenwood High, II
 Richard Alm Hoadley
 William Kenneth Howard, Jr.
 Roger William Hughes
 Roderick Alexander MacLeod
 Richard Alexander Malmstrom, Jr.

William Lyon McClenahan
 Michael Lewis Morrison
 Katherine Cecelia Norris
 William Horton Rasnick
 James Alexander Reichman
 Glenn Noah Rupp, Jr.
 William M. Seymour
 Martin David Silver
 David T. Tackney
 William Lewis Thomas, III
 James Burvell Urquhart, III
 Kenneth Earl Wilkes
 John Charles Zeren

Bachelor of Science in Nursing

Dorothy Ann Adams
 Alice Ruth Avett
 Melanie Leah Balestra
 Jean Evans Berger
 Mary Ellen Billings
 Ann Louise Bohnet
 Catherine Carol Brauch
 Pamela Anna Cavalaris
 Signe Ann Christensen
 Elizabeth McDonald Cozart
 Frances Bellew DeHart
 Karen Ellen Dunn
 Bonnie Lu Ehlers
 Darby Ann Engel
 Karen Louise Grimm
 Patricia Carin Gross
 Linda Dian Habbersett
 Marsha Anne Halfman
 Euphemia Church Bauer Harkrader, II
 Janet Elizabeth Heck
 Brenda Stewart Hemphill
 Elizabeth Michael Henry
 Wendy Lou Higdon
 Carol Ann Hodges
 Janice Claire Jackson
 Eliza Jane Kennedy

Susan Margaret Kunz
 Judith Carol Mayes
 Marcia Kay Meeks
 Linda Aderholdt Moore
 Zelma Frann Mount
 Laura Virginia Oman
 Sharon Kay Patterson
 Sally Machen Peterson
 Mary Beth Alexander Phyfer
 Penelope Ann Prideaux
 Sheila Sanford Rice
 Antoinette Camille Roser
 Gene Whitmore Sahn
 Barbara Lee Schmidt
 Elizabeth Anne Seaholm
 Jean Elizabeth Sitterley
 Carol Ann Snyder
 Elizabeth Helen Thornbury
 Elaine Ward Turner
 Sandra Jane Turner
 Martha Dunbar Vose
 Patricia Ellen Whitenight
 Martha Lee Williams
 Elaine Florence Wishart
 Susan Gaynelle Young

Bachelor of Science in Medicine

John Paul Kapp

Robert Joseph Mignone

Master of Science in Nursing

Janet Baker Craig

Jeannette Mumford Straub

Master of Science

Robert Price Biggers

John J. Brealey

Bobby Bryan Edwards

William Reid Jessup

Ramkrishna Lal Joshi

David Teh-Yu Kao

Walter Allan Kester

Kwang-kiang Lee

Robert Bolling Roe, Jr.

William Joseph Rothamel

Paul David Shelor

Master of Arts in Teaching

Edith Willis Anderson

Mary Virginia Belcher

Nancy M. Pearson

Toby Dena Levenson Sherwood

Bobby C. Spencer

Charles David Walker

Master of Religious Education

Joon Hwa Ahn

Carter Fay Key

Suzanne Heath Manges

John Joseph Theis, Jr.

Master of Education

Linda Kay Black

William Henry Cracknell, Jr.

Francine Miriam Edell

Rebecca Beverly Hobgood

Barbara S. Lethander

Susan Boutwell McCaughan

Barbara Rita Orenstein

Arnold C. Penland, Jr.

Marian Elizabeth Resch

Caryl Ann Rinehart

David Price Rogers

James Rittenhouse Rojahn

Linda Egan Saltz

Master of Forestry

David Morton Bradford

Timothy Creem

Theodore Hugh Daniel

Dennis Ray Darnell

William Frederick Funk

Ronald Leroy Hay

Dennis W. Haynes

Gerald Paul Kemper

Robert C. Loomis

Albert Oettinger, Jr.

Hernan Torres Ojeda

Thomas Denny O'Neal

John David Osborne

Joseph William Price, Jr.

Charles Phillip Patrick Reid

F. David Rhyne

Robert William Sassaman

Franciscus Gunarwan Suratmo

Charles Richard Touvell

Frido van Kesteren

C. Philip Yost

Leslie Hale Young

Master of Hospital Administration

Terry Allen Brown
William Edward Corley
Jimmie Clarke Hocker
Robert Louis Kennedy
James Allen Lamb
Steven John Mozolak

Richard Hyde Peck
Scott Douglas Smith
Jeffrey Lynn Stambaugh
Gerald Wirth Wagner, Jr.
Henry Carrh Wagner, III
Vernon Gregg Watters, III

Master of Arts

Nguyen Huu Ai
Shu Fun Au
Albert John Balash
Emily Whaley Balentine
Robert Francis Bergstrom
Martha Sue Berry
William Priestley Black
Harry Wallace Blair, II
Lucy Wynne Bowers
William C. Bradford, Jr.
George Bryan Breckenridge
Frederick Joseph Breit
Sandra Lou Brown
Judith Mayers Bryan
Francis Joseph Burger
Alan Warren Bushell
Cornelius Bushoven, III
Richard Dudley Carmichael
Bessie Chronaki
Alice Windle Tyler Clapp
Jeffrey Johnstone Clarke
Thomas Watts Collier
Alva Leroy Collins, Jr.
Mildred Elizabeth Coulbourn
Ruth D. Cunningham
Arthur Gordon Lynn Darroch
Carl Dale Donathan
Donna Jean Douglas
Karl Claudius Garrison, Jr.
Grace Mary Garry
Sara Alice Gearhart
Allaire Ann George
Karen Kruse Goodrich
Wendel Eugene Goodrich
Stephan Edward Gramley
Koleen Alice Haire
Richard Erling Hansen
N. Gail Harp
Alan Albert Jabbour

John Leitch Jones
Keisuke Kawakubo
Marguerite Marie Kiely
Hilma Pauline Fenton Kiltinen
William John Lohman, Jr.
John Leland Luternauer
Robert Holland McFadden
Akiko Miyake
Nellie Laurie Moseley
Fouad Mohammed Moughrabi
Charles Jay Nelson
Richard John Neubauer
Nancy Stiles Nickerson
Setsuko Ohara
Kaaren Kupfer Page
Dave Richard Palmer
Gerald C. Papachristou
Henry Lewis Parker
John Harold Joseph Pitcher
Dennis Powell Quinby
Leonard F.B. Reed, Jr.
John Ray Ross
Robert Shane Ryland
Thomas Sanderson Sale
Richard W. Sanders
Mary Jackson Scott
Amelia Segre
Michael John Sherman
Jerry Ashburn Shields
David Edward Edison Sloane
Thomas McMahon Spight
John Arthur Stone
Eric French Taylor
Panee Tejasen
Michael Vincent Raphael Thomason
Gerardo Noe Valdez
Lindley Wyman Van
Harry Carter West
Donald Bruce Zobel

Bachelor of Divinity

David Hubert Aiken

George Richard Albury

Robert Earl Alexander
 Harry A. Allen, Jr.
 John Cornelius Allen, III
 Henry Braxton Allport, Jr.
 Thurman Wilson Anderson, Jr.
 James Donald Ballard
 James Wayne Billings
 Robert E. Boggan, Jr.
 John Francis Brusati
 Clyde David Burberry, II
 James Franklin Caldwell
 John Paul Callahan
 Robert B. Campbell
 Robert Alpheus Clanton, Jr.
 Clifford Harvey Clarke
 Conrad M. Cohen
 Boyce Vernon Cox, Jr.
 Robert Ellis Dowda
 William Byrd Ellison
 Foster A. Embry, Jr.
 Fred Falls, Jr.
 Charles Bertram Felder
 Carol Rogers Fox
 David James Frame
 David William Gaffron
 Harry Yandle Gamble, Jr.
 Francis Swee-Huat Goh
 James Printest Gragg
 John Wesley Grove
 Elmer O. Hall
 Wayne Bruce Hamilton
 Samuel Kaiser Harmon
 William Wayne Hutchinson

Daniel Keith Ivey
 Louis Dwight Jamison
 John Buxton Knott, III
 Samuel Ernest Mann, III
 Robert Edward Manthey
 James Lawrence McCleskey
 Merrill Douglas Meeks
 William Donald Miller
 Robert Clyde Monson
 Norman Earl Neaves
 Gordon Vernon Nelson, Jr.
 Russell Carver Parchman
 John William Reskovic
 Thomas J. Richichi
 Benjamin Charles Rouse
 Sylvester Lorenzo Shannon
 Robert Thomas Sharp
 J. Larry Sharpe
 Ruffin Page Shelton
 Gerald LaFayette Smith
 Roy Glenn Steed
 Thomas Albert Steuart
 Frank Albert Stith, III
 Oliver Franklin Taylor
 Herman Edward Thomas
 Albert Eryvne Thompson, Jr.
 Frank Blair Turner
 Leslie Glenn Tyndall
 Judith Lynne Weidman
 Ronald Lynn Wilson
 Grady Clarence Winegar
 David Earl Winter
 Manuel David Wortman

Bachelor of Laws

Andrew E. Adelson
 Burton Lee Albert
 Richard M. Allen
 William James Alsentzer, Jr.
 Bruce H. Anderson
 Charles David Axelrod
 W. Reece Bader
 Alan Leigh Baier
 George J. Benson
 David Bennett Blanco
 David William Bloom
 Barrington Heath Branch
 Earle Lyman Brooks, Jr.
 Richard Ward Buhrman
 Robert D. Cabe
 John Albert Cairns
 J. Van Carson
 Harry Elmore Cawood

Carroll Schaeffer Connard
 Dale Daniel Conroy
 James A. Courter
 Robert Kennedy Davis
 Alexander B. Denson
 Christine Yarrington Denson
 Judson William Detrick
 Winton O. Etz, Jr.
 John Edwin Evans
 James John Faris
 Miles Roger Feinstein
 Michael Ward Field
 Jerold Albert Fink
 H. Templeton Fowlkes
 Henry Howell Fox
 John Ganotis
 Eura DuVal Gaskins, Jr.
 Robert M. George

Dewey Cabell Gilley, Jr.
 Peter Stephen Gold
 James Michael Goodson
 Harold Alan Haddon
 Anthony Stephen Harrington
 William Graham Harriss
 William Jeffrey Hart
 Russell J. Hawke, Jr.
 L. Mifflin Hayes
 Andrew Stearns Hedden
 Lawrence Cameron Heiser
 George Allen Hillman
 William Kenneth Holmes
 Christopher John Horsch
 Donald Ray House
 Jonathan Thomas Howe
 John Louis Huber
 Mathias P. Hunoval
 Edward Jeremy Hutton
 James Cary Jacobson
 William Lee Johnson, Jr.
 Marshall R. Jones, Jr.
 F. Sherwood Lewis
 Don B. Long, Jr.
 Michael F. Lynch
 James Beckett Maxwell
 Ralph Lee McCaughan
 Devereaux Fore McClatchey
 Jerry J. McCoy
 Daniel M. McDonald
 Eric Coates Michaux
 Peter J. Michel
 Michael L. Miller

Steven Lawrence Miller
 Roy Worsham Moore, III
 Thomas Hayes Morgan
 Joel Joseph Morris
 David Dee Noble
 Sidney Joseph Nurkin
 Carolyn Willingham McCue Osteen
 Ben Louis Paddock
 Richard Almon Palmer
 Spence William Perry
 David Frankman Peters
 Truman Stephen Phillips
 Thomas B. Pitcher
 T. William Porter
 Channing Orr Richards
 Edward Stewart Rickards, Jr.
 Edward Bernard Robin
 Robert Carl Roos, Jr.
 H. James Schlegel
 Robert Haywood Scott, Jr.
 Peter Lee Shaw
 Richard Alan Smith
 Richard Alan Snodgrass
 Arnil L. Snow
 Robert Watson Spangler
 Joseph A. Story
 Kinch Morgan Varner, III
 Douglas P. Wheeler
 Dale Alan Whitman
 Thomas N. Wies
 William Grant Willard, III
 Neil Carson Williams, III
 Donald Fredric Woodcock

Doctor of Medicine

Charles Spencer Adler
 Ann Wellington Alexander
 James Allen Alexander
 Barna Titus Allen, Jr.
 James Kenneth Allen
 Richard Everett Appen
 Richard Crowder Bechtel, Jr.
 Peter Evans Berry
 Wiley Ray Bland
 Ernest Carleton Borden
 John Wilson Bradford
 Earl Winfrey Brian, Jr.
 Robert Glenn Brown
 Peter Gordon Burk
 William Alexander Carr
 Joe Lynn Clark
 Edwin Branan Cooper, Jr.
 John Newman Crook

Donald Patrick Currie
 Walter Etchells Davis
 William Barton Dick
 William Stephen Dillingham
 Lawrence T. Donovan
 Barry Ferris
 Robert Burton Fisher
 Raymond Foust Ford
 William Willis Fox
 Jane Taylor Gaede
 Doyle Gene Graham
 John Andrew Grant, Jr.
 John Elbert Greene
 Todd Michael Grehl
 James Anastasio Halikas
 Elliott Brian Hammett
 George Morris Hayter
 Charles Burkhead Herron

David Charles Hitch
 Christie Benet Hopkins
 James Ronald Johnson
 Sheila Susan Moriber Katz
 George Litton Kline
 Stewart Edwin Kohler
 Alvin Marinous Lewis
 Leif Anthony Lohrbauer
 Mitz McDowell Martin
 James Greig McCully
 Douglas Hugh McGregor
 Robert Joseph Mignone
 Claude Thurman Moorman, II
 Frank Howard Morriss, Jr.
 James Loren Nash
 Emanuel Newmark
 Charles John Niemeyer
 Charles Bryan Norton, Jr.
 James Garland Nuckolls
 Linda Clark Obenour
 William Hypes Obenour, Jr.
 Robert Tilden Osteen
 Earl Alfred Palmer

Vito Anthony Perriello, Jr.
 Willard Cresse Pierson, Jr.
 William David Price
 Karl Arthur Ray
 Marshall Simms Redding
 John Murray Rich
 James Davis Robertson
 Marvin Price Rozear
 George Stuart Scott
 John Paul Shock, Jr.
 Kirkwood Tanner Shultz
 Craig Thomas Smith
 David Helmar Smith
 David Lambuth Smith
 Roberta McNeill Smith
 Joseph Akin Snead
 John Jamieson Stewart, Jr.
 Robert Hays Threlkel
 James Francis Valicenti
 Louis Leslie Wasserman, Jr.
 Jaroy Weber, Jr.
 Lewis Greer Zirkle, Jr.

Master of Laws

Thomas Nelson Taylor

Master of Theology

Richard Alan Clark
 Thomas Carroll Daily
 Daniel Thomas Earnhardt
 James Bartlett Hodges

Luther Harold Lawing, Jr.
 Robert Russell Lewis
 William Warren Newman
 Dale Robert Sessions

Doctor of Education

Herbert Thomas Appenzeller
 Leonidas Judd Betts, Jr.
 Laurie Lawson Byrd
 Dale Wells Caughey
 John Faris Corey
 Charles Henderson Dickens
 Sophie Harrison Fischel

Fred William Hill
 Herbert Cornelius Hudgins, Jr.
 Everette M. Latta
 Walter Travis Martin, Jr.
 George Morris McGuire
 Elton Dewitt Winstead
 Philip Connor Winstead, Jr.

Doctor of Forestry

Forrest Morgan Buckingham
 Melvin Dee Strickler

William Payne Thompson

Doctor of Philosophy

James Goodear Abert
 Michael Cameron Andrews

Nicholas Richard Ayo
 Yalman I. Balta

Neal Mason Barnett
 Clelmer Kay Bartell
 John Edwards Baxter, Jr.
 Brian L. Blakeley
 Richard Steven Blanquet
 Charles Boghosian
 John Ernest Boliek
 Thomas Earl Borcharding
 Ralph Alden Bradshaw
 Louise Stephens Brown
 William J. Brown
 William Alexander Calder, Jr.
 Joseph Gordon Campbell, Jr.
 John Fulton Chant
 John Wehrley Chapman
 Limin Chu
 Bruce L. Clayton
 Albert Leroy Danielsen
 Alvin Dozeman
 Charles Peter Driscoll
 Mary Adams Dudley
 John Joseph Dunn
 Ghazi B. Duwaji
 Clifton Earl Edmondson
 Magdi Mohammed El-Kammash
 Robert Lee Ellis
 Ian Heinrich Eybers
 Alejandro M. Fernandez
 Lloyd Wesley Gay
 Edgar Bryan Gillespie
 Jack Lawrence Granatstein
 Claude Carrington Gravatt, Jr.
 Robert Dorset Graves
 Ernest Ray Griffin
 Syed Mohammad Haider
 Welf Henry Heick
 William Robert Hendley
 Gale Bartholomew Hill
 Douglas Irving Hodgkin
 Leonidas John Jones, II
 Robert Griffith Jones
 William Jonas Jones, Jr.
 James Daniel Jordan, Jr.
 Jon Howard Kaas
 Gerald Bluestone Kauvar
 Dewey Lynn Kerbow
 William David Kenneth Kernaghan
 Nadia Khalaf

Paul W. Kirk, Jr.
 Mirza Hamid H. Kizilbash
 David Bates Knight
 Edward Byron Knippling
 Norman Edward Kowal
 Jose Mari Lacambra
 Alphonse Joseph Langlois
 Frank Lentricchia
 Granville Douglass Lewis
 Peter Kirby Manning
 David A. F. Marshall
 Jane DeHart Mathews
 William Maurice McDaniel
 Daniel Bennett McGee
 John Peter Meekison
 Lee Norman Miller
 Mary Ruth Miller
 Donald William Millholland
 L. E. Moore
 Bernard Arthur Morin
 Bernard Francis Oppel
 Michael Jerome Parkhurst
 Fred Olthus Purser, Jr.
 Robert Coleman Richardson
 Robert Lewis Robinson
 James Engel Rocks
 James Richard Sawers, Jr.
 Ralph Gerald Saylor
 William Arthur Schaffer
 James Pressly Sherer
 Emily Knapp Shirley
 Howard Everett Shook, Jr.
 Merrill Maguire Skaggs
 Frank Gill Slaughter, Jr.
 Fletcher Douglas Srygley
 James Donald Stanfel
 Donald Henry John Steensen
 Paul Bernard Stephenson
 Robert Henry Tabony
 Sylvia Alice Earle Taylor
 Robert Meredith Terry
 Agnes Anne Trotter
 Henry Griffith Utley
 William Cornelius Ward, Jr.
 Jesse Davis Wellons, III
 Louis Edgar Wright
 Avrum Joseph Yarmat
 Lesley Lee Zimic

Commissions in the United States Navy and Marine Corps
Ensign, United States Navy

Frank Lee Bowman

Charles Howard Cruse

William LeRoy Dowdy, III
Donald Kenneth Edgerton
Sam Leon Foushee, Jr.
Bruce Harold Johnson
Francis Frederick Kaufhold
William Ellis Kennedy, Jr.
Michael Randolph Manes
William John McNally, III

Wayne Hamilton Miller
Charles William Pennington
Peter Wood Pierce
Richard Stanley Thomas
Edward Claude Thompson
David Watson
Robert Benjamin Whitley

Ensign, United States Naval Reserve

Thomas Sawyer Hackett

Robert Jeremiah Keller

Second Lieutenant, United States Marine Corps

Walton Ford Chapman
Richard Burton Newton

Robert Marshall White

Commissions in the United States Air Force

Second Lieutenant

James Hoffert Brindle
Winston Gordon Fowler
Thomas Adrian Furness, III
Harold Glenwood High, II
William Kenneth Howard, Jr.

John D. Moxley, Jr.
Michael Marvin Self
Timothy Anderson Sinclair
Christopher Scott Stiles

Degrees Awarded September 1, 1965

Bachelor of Arts

Arturo Jose Aballi, Jr.
Eloise Porter Alexander
Robert Burton Amley
Peter Michael Balitsaris
John Strauchan Blick, III
John Robert Burke
John Arnold Cawley, Jr.
Camilla McKee Cochran
Mary Camille Combs
Carolyn Annette Cox
Judson Davie DeRamus, Jr.
Nancy Lee Ebert
James Harold Fairbanks
Robert Hart Fogle
John Nicholas Fountain
David Harper Friedlein
Michael I. Gillman
Jerry Jay Goodmark

David Louis Darragh Green
Henry McClellan Greenleaf, Jr.
Leslie Carol Grey
Marietta Ferebee Guidon
Richard Hunt Harding
Eric Mills Holmes
Forrest Lenox Jerome, III
Robert Milton Johnston
Ann Myers Jordan
Harry Joseph Kane, Jr.
Robert Frank Kiesau
Hollis Heaton King
Carol Sue Lacy
William Carr Lane
Jackson Frederick Lee, Jr.
Richard Thomas Linnemann
Daniel Johnson Lonon
Thomas Cameron MacCaughelty

David Edward Mack
 Milton S. McLain
 Robert Carroll Menson
 Thomas Daniel Mincher
 Susan Beard Norton
 Thomas Ray Oglesby, Jr.
 James Ralph Oliver
 Paula Elizabeth Oliver
 William Cannicott Olson
 James Buckley Pignona, Jr.
 Kenneth Arthur Podger, Jr.
 Pia Tavernise Price
 Sylvia Anne Saunders
 James M. Scott

William Barry Shives
 Thomas Lee Ticktin
 David Hugh Tilley
 Dudley Pierce Turner
 Peter Travis Van Sciver
 Alfred Jefferson Waldchen
 Elizabeth Orr Walker
 B. Frederic Williams, Jr.
 Mary Hazel Willis
 Mark Kammer Wilson
 Charles Granville Young, III
 Carl Thomas Zimmer
 George I. Zupanic, Jr.

Bachelor of Science

John Argy
 Frank Garnett Cowherd, III
 George Landon Feazell, Jr.

John William Hartwell
 Jerry Lewis Newton, III
 Harry Terrell Stanfield

Bachelor of Science in Mechanical Engineering

Jerry Douglas Francis
 James Griffith Kaighin

Donald B. Reed
 Gary Lee Witzenburg

Master of Science in Nursing

Norma A. Beggerly
 Donna Lee McAdams

Mary Ann Rohrhurst Peter
 Virginia Gibbs Wessels

Master of Science

Max Fernando Cordova
 Alexander Sally Herbert, Jr.
 Luis R. Osoros
 Edmond Austin Overstreet, III

Eugene Richard Sams, Jr.
 Charles Franklin Starmer, Jr.
 George Joseph Titus

Master of Arts in Teaching

Ann Stuart Andrews
 Susan Himer Baker
 William F. Blank
 Alfred Lawrence Booth
 Emilie Carole Brannon
 Marjorie Cynda Briley
 Alyse Gautier Lucas Corcoran
 Henry H. Crockett
 Marvel Joyce Davison
 Carylton Billings Dockery
 Nancy Stevens Fairchild
 William Edward Floria
 Gustav H. Franke, Jr.

Philip J. Galanti
 David Hooker Stilson Hardin
 Paul John Harrington, Jr.
 David Thomas Hayes
 Carolyn Holmes Hopgood
 James Henry Ives
 Patricia Ann Johnson
 Janet Marie Jordan
 H. Hart Kait
 Sarah Hodges Leverett
 Flora Katherine Looney
 Bettie Carpenter Lyerly
 William W. R. Macdonald

Ethel Ann Manaker
 Don Patrick Marchese
 Henry Frederick Martin, III
 Rebecca Grace Matthews
 Jean Alden McCurdy
 Douglas E. McIntyre
 Mary Kay McKenna
 Lillian Elizabeth McKeown
 Dale E. Means
 Priscilla Withrow Morse
 John Mullen, Jr.
 Elizabeth Shirley Perry
 Barbara Lucas Regen

Eleanor Rigney
 Frances Pennell Scarboro
 Samuel Scoville, III
 Carolyn Holt Smith
 Charles F. Tank
 Martha Marie Thomas
 Rosslyn Troth
 Linda Ann Truluck
 Marion Augustus Wash
 John Hunter Wheatley
 Joanne Carol Wilcox
 Ronald B. Wilde
 Henry J. Wuensch

Master of Education

Jesse Lee Allen
 Rebecca Edwards Barrier
 Gloria Jean Bentz
 El Nadal Clark
 Lois Allen Einwachter
 Patricia Jackson Jefferis
 Allen Ray Lamm

Erastus Bennett Parks, III
 Reid Reginald Rogers
 Dorothy Mauldin Shows
 Gail Marie Tousey
 Sarah Clifford Wallace
 Nancy Grady Wilson

Master of Forestry

Stephen James Tellman

Master of Arts

Lois Annette Chalker Askew
 James Lee Babin
 Patricia Mobley Barker
 Frank D. Bean, Jr.
 Robert Anthony Benedetti
 Willard Miller Berry
 Robert Bruce Bickley, Jr.
 Margaret Elaine Moss Borcharding
 Penelope Warren Briceland
 Clark R. Cahow
 Mary Dawson Chambers
 Anthony F. Cilluffo
 Carolyn Idol Coble
 Catherine Ward Cockshutt
 Edward Wilson DuRant, Jr.
 Joseph Dewayne Dutton
 Elizabeth McClellan Fleming
 Richard Timothy Friedmann
 Douglas Sloan Harlan
 Charles Stanley Harris
 William Nolan Kammer
 David Frederick Krein
 William Lawrence Larche
 Chloe Doby Little
 Paul Stroman Lofton, Jr.

Sheila Noel Marrissey
 Richard Gordon Moulden
 James Minor Nickell
 David William Osgood
 Calvin Irvin Owens
 Kantibhai Ashabhai Patel
 John Franklin Pfeiffer, II
 Colette Simpson Phillips
 Jeffery Travis Phillips
 Charles Henry Racine
 Alfred Lunsford Recouley, III
 Robert Harold Roth, Jr.
 Frederick Saide
 Barbara Ayers Sauls
 Warren Lee Shepherd
 Joan Holmquist Smith
 Veda Bakwell Sproue
 Marijim Stockton
 John William Thompson, III
 Sylvia Porter Thorne
 Richard Vasil Tsina
 Ferderick David Ullman
 James Alexander Vaughan, Jr.
 Karen Hanke Weeks

Doctor of Medicine

Benjamin Domenick Venetta

Doctor of Education

Rufus Benton Turner

Doctor of Forestry

Barry Towers

Doctor of Philosophy

Nadhla Abdul-Halim
Victor Aleman Aleman
James Newton Brown, Jr.
John Jesse Carey
Dipankar Chattarji
Ben Wayne Feather
Rosalie Prince Gates
Edward Hayes Hagerman
Robert Arthur Hohner
Engin Inel Holmstrom
Richard Inglis
Sung Kyu Kim
John Dermont Kirkland, Jr.
Larry James Kirkpatrick
Richard Burton Kline
James Marquis Kuist
Marshall Edwin Landay
Donn Barry Lipscomb
Andrew Fleming Long, Jr.
Ernest Ashbury Lumsden, Jr.

John William MacGorman
Clayton Clarke Morgareidge
Bernard James Nebel
Patricia June Rand
Richard Wesley Rhoades
David Charles Roller
David Sandler
Kerry Franklin Schell
William Seale, Jr.
Albert Parker Sheppard, Jr.
John Sidney Shrauger
William John Stober, II
Idris Rhea Traylor, Jr.
Carl Byron Turner
Grayson Hall Via
Charles Frederick Wells
William Hayes Williams
John Crawford Winfrey
John K. Yost
Joseph Zikmund, II

Honors and Distinctions of Candidates for Degrees, 1966

Summa cum laude, June 6, 1966

Georgiandra Little
Robert Clayton Wheland
David Caster Hoaglin
Carolyn LeNora Ray
Charleene Lance Jordan

Magna cum laude, June 6, 1966

Julian Dean Heller
Martha Cole Hervey
Sherry Ann Kellett
Rilla Louise Carter

Lynn Thomas Gillman
Ingrid Dagmar Arnold
Charlotte Anne Bunch
Peggy Jolene Spivey Hackney
Nancy White Stead
Catherine Jane Carlile
Paul Clinton Echols
Joan Frances Carew
Frank Jackson Huffman, Jr.
Cynthia Ann Gilliatt
Linda Kay Bemis
Judith Anne Rudolf
Todd Michael Lieber

Linda Belle Gregory
Jill Robie Holmquist
Teresa Ann Patch
Martha Lou Dantzler
Rickard Frank Pfizenmayer
Mary Elizabeth Snyder
Carol Anne Christy
Leslie La Verne Davidson

Donald Oscar Parsons
Barbara Nadine Fox
Dorothy Houston Daniel
Donald Francis Young
Louise Brown Kennedy
Robert W. Widell
Sarah Louise Baker
Barry B. Boyer

Honors in Departments and Schools

Departmental Graduation with Distinction

Art

Leslie La Verne Davidson

Chemistry

William Councill Archie, Jr.
William Johnston Boyle, Jr.
Sherry Ann Kellett
Nancy White Stead
Robert Clayton Wheland

Civil Engineering

Linwood Arnold McCullers
Craig Stevens Volland

Economics

John Treleaven Blakely
James Murray Boughton
William Franklin Drew, Jr.
David Harold Hopkins
William Clarence Hufford
Walter Hill Lindsay, Jr.
Donald Oscar Parsons
Rickard Frank Pfizenmayer
Michael Claude Russ

Electrical Engineering

Jeffrey Michael Brick
Nicholas Brienza
Charles Henry Rogers

English

Bruce J. Alexander
Dorothy Houston Daniel
Todd Michael Lieber
Kathleen Pendleton Malley
Caryn Lynne McTighe

French

Charles Frederick Altman

German

Sarah Louise Baker
Jill Robie Holmquist

History

Charlotte Anne Bunch
Paul Clinton Echols
Sara Margaret Evans
Frank Jackson Huffman, Jr.

Mathematics

David Caster Houglin
James Timothy Robinson
Joseph Madison Thompson
Donald Francis Young

Mechanical Engineering

Robert Nicely Armstrong
Donald Horace Bellman, Jr.
Harry Price Gray
Harold Glenwood High, II
Katherine Cecelia Norris
Glenn Noah Rupp, Jr.
James Burwell Urquhart, III
Kenneth Earl Wilkes

Music

Paul Clinton Echols
Marvin Ormond Hardin
Benjamin Sherwood Peck

Political Science

Howard Clinton Hay
Margaret Camwath Jones
Philip Patrick Lader

Psychology

John Albert Palmer, Jr.

Religion

Jill Hudson Salinger

Spanish

Rilla Louise Carter

Zoology

Betsy Lee Beineke

Georgiandra Little

College of Engineering

Summa cum laude, June 6, 1966

Nicholas Brienza

Magna cum laude, June 6, 1966

Charles Henry Rogers

Katherine Cecelia Norris

James Burwell Urquhart, III

Linwood Arnold McCullers

Glenn Noah Rupp, Jr.

Jeffrey Michael Brick

Harry Price Gray

Lester Hill

Elections to Tau Beta Pi

Robert Nicely Armstrong

Donald Horace Bellman, Jr.

Jeffrey Michael Brick

Nicholas Brienza

Harry Price Gray

Judith Anne Grimes (badge)

Harold Glenwood High, II

Lester Hill

Linwood Arnold McCullers

Katherine Cecelia Norris (badge)

Robert Burks Ridenhour

Charles Henry Rogers

Glenn Noah Rupp, Jr.

Martin David Silver

James Burwell Urquhart, III

Craig Stevens Volland

Kenneth Earl Wilkes

The Divinity School

Summa cum laude

David James Frame

Harry Yandle Gamble, Jr.

William Warren Newman

Magna cum laude

Robert Edward Manthey

James Lawrence McCleskey

Merrill Douglas Meeks

Norman Earl Neaves

School of Law

Elections to the Order of the Coif

Richard M. Allen

Charles David Axelrod

J. Van Carson

Harold Alan Haddon

Jonathan Thomas Howe

David Dee Noble

Thomas B. Pitcher

Robert Haywood Scott

Dale Alan Whitman

Thomas N. Wies

Graduated with Distinction

Richard M. Allen

Charles David Axelrod

W. Reece Bader

J. Van Carson

John Edwin Evans

Jerold Albert Fink

Harold Alan Haddon

L. Mifflin Hayes

Lawrence Cameron Heiser

Jonathan Thomas Howe

David Dee Noble

Ben Louis Paddock

Truman Steven Phillips

Thomas B. Pitcher

Robert Haywood Scott, Jr.

Dale Alan Whitman

Thomas N. Wies

School of Medicine

Elections to Alpha Omega Alpha

James Allen Alexander
Barna Titus Allen, Jr.
Peter Evans Berry
Donald Patrick Currie
Walter Etchells Davis
John Andrew Grant, Jr.
Elliott Brian Hammett

Stewart Edwin Kohler
Robert Joseph Mignone
Charles John Niemeyer
Robert Tilden Osteen
Marvin Price Rozear
Robert Hays Threlkel
Jaroy Weber, Jr.

Special Prizes and Awards

Air Science Department: Distinguished Military Graduates—

Harold Glenwood High, II
John D. Moxley, Jr.

*Alpha Kappa Psi Award—*John Martin Boop

*American Public Works Association Prize—*David Thomas Hartgen

*American Society of Civil Engineers Prize—*Linwood Arnold McCullers
Craig Stevens Volland

*American Society of Mechanical Engineers Award—*Michael Lewis Morrison

*Alice M. Baldwin Award—*Martha Cole Hervey
Carolyn Louise Sherman
Mary Elizabeth Snyder

*Evelyn Barnes Memorial Award—*Sarah Louise Baker

*Borden Undergraduate Research Award in Medicine—*Robert Joseph Mignone

*Davison Scholarship—*Ernest Carleton Borden (1966)
William Willis Fox (1965)

*Dermaquizz Award—*Charles Burkhead Herron

*Duke University Department of Chemistry Award—*William Councill Archie, Jr.
Sherry Ann Kellett
Robert Clayton Wheland

*Duke University School of Medicine Award—*George Morris Hayter
Vito Anthony Perriello, Jr.

*Duke University School of Nursing Alumnae Award—*Mary Beth Alexander Phyfer

Friends of D. U. Library Book Collector's Award—

First Prize—Charles Frederick Altman
Second Prize—Paul Clinton Echols
Third Prize—Stefan David Berg
Hillis Mairy Scribner

*Hamilton Watch Award—*Jeffrey Michael Brick

*Lange Medical Publications Award—*Anne Wellington Alexander
Leif Anthony Lohrbauer

*William T. Laprade History Prize—*Paul Clinton Echols

*Robert E. Lee Award—*Rodney Owen Stewart

*Machinery Magazine's Award—*Harry Price Gray

Merck Index Award—Nancy White Stead
Robert Clayton Wheland

Milmow Prize—John Wallace Dowdee, III

C. V. Mosby Book Award—William Barton Dick
Robert Joseph Mignone
Robert Tilden Osteen
Marvin Price Rozear
Jaroy Weber, Jr.

Moseley Award—Brenda Stewart Hemphill

Naval Science Department: Distinguished Military Graduate—Bruce Harold Johnson

North Carolina Association of C.P.A. Medal—Myron Roy Lichty

Roche Award—Marvin Price Rozear

Henry Schuman Music Prize—Marvin Ormond Hardin

Charles Ernest Seager Memorial Award—Randolph Kent Repass

Walter J. Seeley Scholastic Excellence Award—Nicholas Brienza

William Senhauser Prize—Howard Clinton Hay
David Hastings King

George Sherrerd III Memorial Award in Electrical Engineering—Nicholas Brienza

Elections to Phi Beta Kappa During 1965-1966

Marjorie Clare Anderson
Ingrid Dagmar Arnold
Sarah Louise Baker
Susan Winfield Bayles
Linda Kay Bemis
William Maurice Blackshear, Jr.
James Murray Boughton
Barry Bruce Boyer
Samuel Mauney Bradley
Jeffrey Michael Brick
Nicholas Brienza
Barbara Greaves Buckman
Charlotte Anne Bunch
Joan Frances Carew
Catherine Jane Carlile
Rilla Louise Carter
Carol Anne Christy
Carlyle Andrew Clayton
Dorothy Houston Daniel
Martha Lou Dantzler
Leslie La Verne Davidson
Paul Clinton Echols
Elizabeth Owen Falk
Barbara Nadine Fox
Cynthia Ann Gilliatt
Lynn Thomas Gillman
Harry Price Gray

Linda Belle Gregory
Peggy Spivey Hackney
Julian Dean Heller
Martha Cole Hervey
Scot George Hickman
Lester Hill
Jill Robie Holmquist
Frank Jackson Huffman, Jr.
Gaye Humpton
Allen W. Imershein
Louise Jaquette
Dexter Lee Jeffords
Charleene Lance Jordan
Louise Brown Kennedy
Philip Patrick Lader
Linda Allison Leftwich
Todd Michael Lieber
Georgiandra Little
Rodney Hammond Lusk
Kathleen Pendleton Malley
Linwood Arnold McCullers
Katherine Cecelia Norris
John Albert Palmer, Jr.
Donald Oscar Parsons
Teresa Ann Patch
Rickard Frank Pfizenmayer
Mary Elizabeth Pickering

Carolyn LeNora Ray
 Susan V. Reynolds
 Charles Henry Rogers
 Judith Anne Rudolf
 Glenn Noah Rupp
 Jill Hudson Salinger
 Martin David Silver
 Lucia Elisabeth Simpson
 Mary Elizabeth Snyder
 William Robert Somers

Nancy White Stead
 Jon Woodford Stuebner
 John David Sutherland
 James Burwell Urquhart, III
 Craig Stevens Volland
 Kenneth Lee Wertz
 Robert Clayton Wheland
 Robert Warner Widell
 Kenneth Earl Wilkes
 Donald Francis Young

Elections from Ph.D. Candidates, 1965-1966

John Wehrley Chapman
 Clifton Earl Edmondson
 Lloyd Wesley Gay

John Peter Meekison
 Robert Coleman Richardson
 Charles Frederick Wells

Trinity College

Freshman Honors

Students listed according to average

Jeffrey David Rothen
 Roswell Howard Spears, III
 Douglas George Sprugel
 Mark Nelson Yorra
 John Anthony Bonavita
 Henry Baker Perry, III
 Richard Franklin Fox
 Donald Wayne Pearce
 Roger Harold Ost Dahl
 Lyndon Charles Molzahn
 James Reeves Koonce
 Jeremiah Richard Marion
 Dallas Kern Holoman
 Mark Jay Hauser
 Charles Thomas Clotfelter

George Edward Felton
 Frederick Zengel, Jr.
 James Griffith Whildin, Jr.
 Dorian Harry Coppenhaver
 George Carey Fuller
 Douglas Milburn Toot
 David Jackson Bailey
 Dale Russell Shaw
 John David Englar
 Thomas Theodore McNeer, III
 William Ratliff Finger
 Samuel Letcher Barton
 Willard Leland Eckhardt, Jr.
 Bert Edward Park
 George Nassif Corey

Sophomore Honors

Bruce Douglas Noe
 John Seaman Townsend
 Jasper Lee Cummings, Jr.
 John Jefferson Davis
 David Lawrence Kneapler
 Robert Macadam Cooper
 John Fred Eggleston, Jr.
 Joel Barr
 John Kelver Willis
 Robert James Waldman
 Robert Gerald Lees
 Jerome Harold Saks

Charles Gettys McClure
 Grady Wilson Miller, III
 Richard William Reifsnnyder
 Edwin Lloyd Norris
 Paul Mason Stokes
 Frederick Parkinson Knappe
 William Gordon Snyder
 Boris Matija Peterlin
 John David Taurman
 James William Kalat
 James Stevan Calver

Junior Honors

Leslie Pearlstein
Douglas Michael Shasby
William Roy Taylor, Jr.
Dana Irving Dadson
Richard William Tasker
Dennis Marion Campbell
Donald Craig Brater
John Spahr Haydock
Everett F. Jacobus, Jr.
John Clement Ruggero
Gary Richard Feichtinger
Richard Rutter Gross
Donald Allen Peck
Charles Clinton Wilson
Arthur Bridge
William Lank High
James Hubert Coil, III
David Alan Hughes
Raleigh Alexander Shoemaker

Gerald Black Ahmann
Jory Lewis Braun
Jon Robert Fichtelman
Donald R. Charlesworth
William Jackson Ackerman
Kenneth Clyde Fischer
David Jackson McGinty
James Dendy Mann
Jack Weatherly Crosland
William Ray McIntire
James Stevenson Wunsch
John Gary Dean
Bruce Winchester Stone
James Keith Hasson, Jr.
Richard Dell Ziegler
Dean Thomas Hokanson
Jeffrey Smith Werner
John Douglas Stewart

The College of Engineering

Freshman Honors

Students listed according to average

Anthony Dean Morgan
David Alan Poleski
James Roy Jackson
Eric Vassar Witt
Walter Selsman Bradley
Thomas Allen Powers

John Cecil Wilkinson
John Preston Harper, Jr.
Thomas Horton Beckett
John Vick Mickey
John Howard Judd, Jr.
Frederic Marsh Ramsey

Sophomore Honors

Russell Lawrence Schoudt

Dennis Howard Matthias

Junior Honors

Kenneth Charles Behnken
Barbara Carol Campbell

Marshall Aubrey Gallop
Stephen Craig Coley

The Woman's College

Freshman Honors

Students listed according to average

Jane Ellen Sexton
Mary Kendra Lewis
Mary Etta Eyer
Ellen Gaike Titus
Julie Bergren Holmquist

Sharon Lorraine Bonney
Sandra Jean Dillard
Merle Frances Schreiber
Carol May Anderson
Jean Edith Martin

Teresa Dreyan Palmer
Mona Jean Gardner
Sue Dean Batson
Bonlyn Elizabeth Agan
Deborah Lynn Smith
Susan Marie Lucas

Whitney Lynne Werhert
Dorothy Elizabeth Rupp
Margaret A. Van Antwerp
Mary Jane Kellett
Patricia Rhea Ware

Sophomore Honors

Ann Leslie Stanford
Patricia Gray Berg
Gwynne Lula Ormsby
Betty Boyd Cockrill
Rebecca Dunitz
Katherine K. Humphreys
Nancy Bowen Page
Martha Carol Brimm
Dorothy Mary Cohdes
Polley C. Ott

Maryellen A. Fullerton
Lucy Anne Roberts
Sarah Elizabeth Warder
Leslie Uhl Rock
Jacqueline Mary French
Mary Hollenbeck
Leslie Marion Jones
Barbara Jeanne Deering
Linda Joyce McKissack
Mary Corinna Head

Junior Honors

Mary Huston Harris
Sarah G. Wilson
Holly Wilson Davis
Josephine T. Humphreys
Karlen Ruth Lyons
Sharon Paine Stephens
Elaine Ehrensperger
Carol Ann Barthel
Susan Jeannette Henney
Bonnie Sue Rothman
Wendy Elizabeth Herrmann
Vivian Collier
Brenda Kristen Koll
Karen Diane Volz
Carol Goodwin Barbour
Cathy Hamilton Losey
Elaine Marilyn Bouchard
Dorothy Lorene Feeney
Sandra Cathleen Paine
Jean Elizabeth Ransburg
Janet Elizabeth Gurkin

Alice Leone Stallings
Sandra Louise Althouse
Geraldine Ruth Cleary
Mary Kathryn Gnuse
Anne Walker White
Elizabeth Louise Vos
Jini Rambo
Karen Louise Kern
Joyce Hendley Barbare
Elizabeth H. Rich
Mary Elizabeth Earle
Brenda Jean Carlson
Dianna Lee Denton
Patricia Anne Roberts
Jane Creviston Darland
Margaret Corinne Craig
Margaret Louise James
Barbara Anne Keen
Margaret Louise Speight
Joy Elizabeth Stoaks
Wilhelmina M. Reuben

Summary

Enrollment

Enrollment on the Semester Basis 1965-1966

<i>School or College</i>	<i>Fall Semester 1965</i>	<i>Spring Semester 1966</i>
Trinity College		
<i>Regular Students</i>	2,134	2,086
<i>Special Students</i>	47	56
Total	<u>2,181</u>	<u>2,142</u>
College of Engineering		
<i>Regular Students</i>	387	396
<i>Special Students</i>	—	—
Total	<u>387</u>	<u>396</u>
Woman's College		
<i>Regular Students</i>	1,265	1,230
<i>Special Students</i>	62	54
Total	<u>1,327</u>	<u>1,284</u>
School of Nursing		
<i>Regular Students</i>	268	260
<i>Special Students</i>	15	14
Total	<u>283</u>	<u>274</u>
Divinity School		
<i>Regular Students</i>	215	207
<i>Special Students</i>	28	21
Total	<u>243</u>	<u>228</u>

School of Forestry		
<i>Regular Students</i>	51	53
<i>Special Students</i>	22	15
Total	73	68
School of Law		
<i>Regular Students</i>	322	320
<i>Special Students</i>	2	2
Total	324	322
Graduate School of Arts and Sciences		
<i>Regular Students</i>	831	745
<i>Special Students</i>	633	675
Total	1,464	1,420
Total Enrolled on Semester Basis		
<i>Regular Students</i>	5,473	5,270
<i>Special Students</i>	809	837
Total	6,282	6,107

Enrollment on the Quarter Basis 1965-1966

	<i>Summer Session 1965</i>	<i>First Quarter 1965</i>	<i>Second Quarter 1965</i>	<i>Third Quarter 1966</i>	<i>Fourth Quarter 1966</i>
Medical School					
<i>Regular Students</i>	100	320	314	279	254
<i>Special Students</i>		1		1	
<i>Fellows</i>	88	88	88	88	88
<i>Interns</i>	67	67	67	67	67
<i>Residents</i>	230	230	230	230	230
Total	485	706	699	665	639

Summary: Fall and Spring Enrollment 1965-1966

Fall Enrollment	6,988
Spring Enrollment	6,772

Miscellaneous Terms

<i>Course</i>	<i>Number of Students</i>	<i>Length of Term (Mos.)</i>	<i>Beginning of Term (Registration)</i>
Anesthesiology	11	24	January
Dietetics	10	12	September
Hospital Administration	26	24	January & July
Master of Science in Nursing	1	12	September

Pharmacy Interns	0	12	June
Physical Therapy	14	15 and	September
		24	
Radioisotope Technician	7	3 and	Varies
		6	
X-Ray Technology	18	24	September

Summer Enrollment

	<i>Term I</i>	<i>Term II</i>	<i>July</i>
Regular Students	1,733	1,447	
Mycology			13

Government, Administration, and Instruction*

The University Trustees		35
Trustees Emeriti		11
Emeriti		69
General Administration		13
Instructional Staff		1000†
<i>Professors</i>	300	
<i>Associate Professors</i>	206	
<i>Assistant Professors</i>	233	
<i>Adjunct Faculty</i>	8	
<i>Instructors (Associates)</i>	110	
<i>Lecturers</i>	8	
<i>Part Time Instructors and</i>		
<i>Graduate Tutors</i>	100	
<i>Visiting Professors and Lecturers</i>	35	
Educational Administration		21‡
Business Administration		22§
Institutional Advancement		32§
Student Affairs		19**

* Complete through November 1, 1965.
 † Includes nine officers listed with the General Administration.
 ‡ Does not include eight officers listed with the General Administration and 36 officers with academic rank listed with the Instructional Staff.
 § Does not include two officers listed with the General Administration.
 ** Does not include seven officers with academic rank listed with the Instructional Staff and three officers listed with the Educational Administration.

Other Officers		60††
<i>Duke University Press</i>	5	
<i>Music and Art</i>	4	
<i>Physical Education, Trinity College</i>	14	
<i>House Counselors, Woman's College</i>	11	
<i>Food Services</i>	17	
<i>The University Stores</i>	9	
The University Libraries		98††
<i>Total</i>		1391§§

†† Does not include one officer listed with the General Administration and 18 officers with academic rank listed with the Instructional Staff.

‡‡ Does not include four officers with academic rank listed with the Instructional Staff.

§§ Does not include duplications. An officer is counted in the first category in which his name appears.

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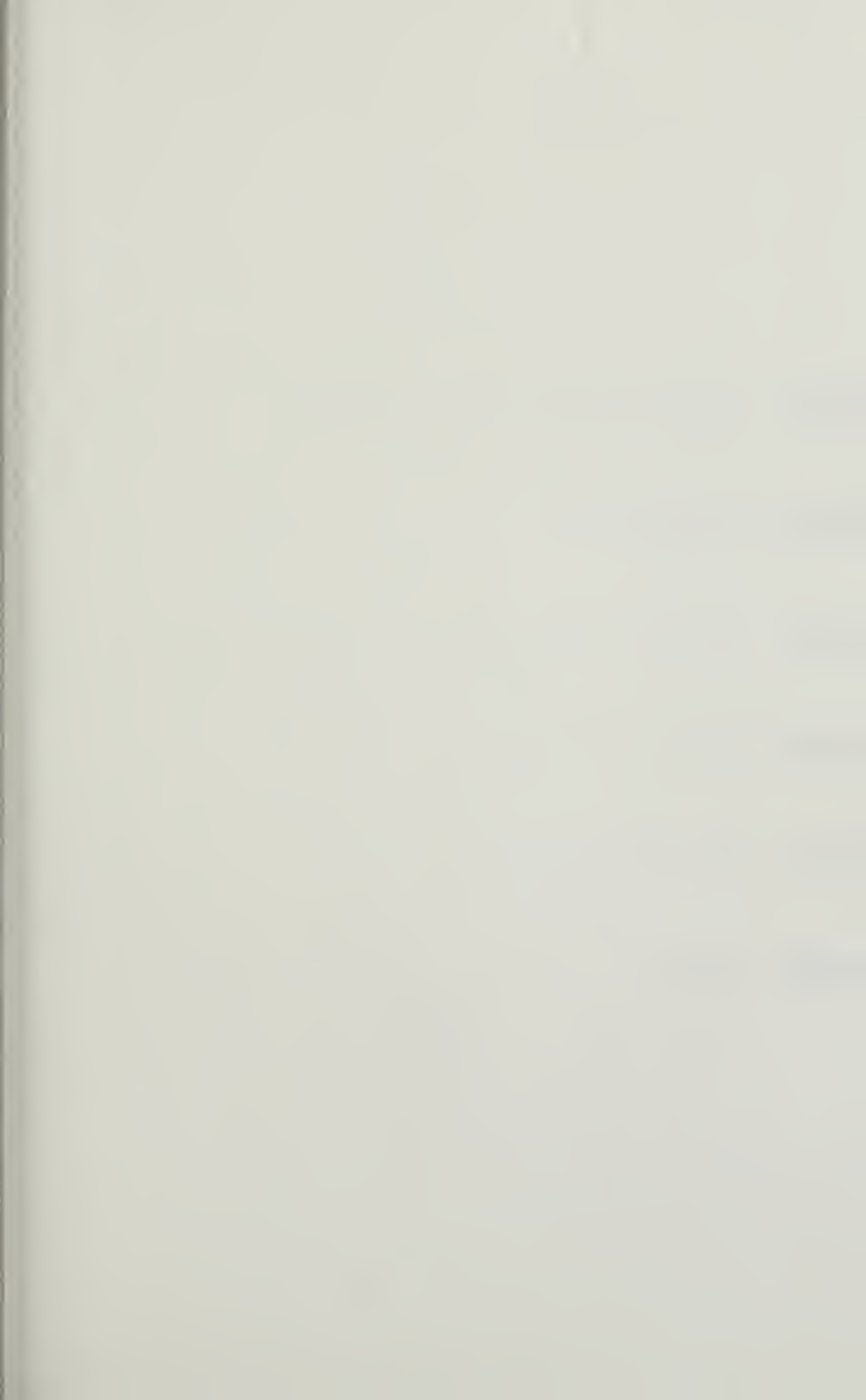
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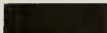
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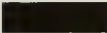
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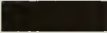


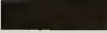
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 The Summer Session

 Appendix



Bulletin of Duke University

Information for Prospective Students



Annual Bulletins

For BULLETIN OF INFORMATION FOR PROSPECTIVE STUDENTS, apply to *Office of Admissions*, Duke University, Durham, N. C. 27706.

For BULLETIN OF UNDERGRADUATE INSTRUCTION, apply to *Office of Admissions*, Duke University, Durham, N. C. 27706

For BULLETIN OF ENGINEERING, apply to *Office of Admissions*, Duke University, Durham, N. C. 27706

For BULLETIN OF THE DIVINITY SCHOOL, apply to *The Dean of the Divinity School*, Duke University, Durham, N. C. 27706

For BULLETIN OF THE SCHOOL OF FORESTRY, apply to *The Dean of the School of Forestry*, Duke University, Durham, N. C. 27706

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For BULLETIN OF THE SCHOOL OF NURSING, apply to *The Dean of the School of Nursing*, Duke University, Durham, N. C. 27706

For BULLETIN OF THE SUMMER SESSION, apply to *The Director of the Summer Session*, Duke University, Durham, N. C. 27706

Volume 38

June 1966

Number 8-A

Published by Duke University monthly except in July, August, September, and December. Entered as second-class matter March 25, 1929, at the Post Office of Durham, North Carolina, under the Act of August 24, 1912.

Bulletin
of
Duke
University

Information for Prospective Students

June 1966

General University Administration

- Douglas Maitland Knight, Ph.D., *President of the University*
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Everett Harold Hopkins, M.A., LL.D., *Vice President for Planning and Institutional Studies, Assistant Provost*
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Richard Lovejoy Tuthill, Ed.D., *University Registrar*
Craufurd David Goodwin, Ph.D., *Secretary and Assistant Provost*
Edwin Constant Bryson, LL.B., *University Counsel*

Undergraduate Administration

- James Ligon Price, Ph.D., *Dean of Trinity College*
Mary Margaret Ball, Ph.D., *Dean of The Woman's College*
James Lathrop Meriam, Ph.D., *Dean of the College of Engineering*

Undergraduate Admissions

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Clayton W. Lewis, A.B., *Assistant to the Director of Undergraduate Admissions*
Mrs. Lynne Comas, A.B., *Admissions Counselor*
Arthur Marvin Quattlebaum, A.B., *Admissions Counselor*

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The University

Although Duke University as a corporate entity dates from 1924, its roots go back nearly a century and a quarter to the Union Institute, founded in 1838 in Randolph County. "Dedicated to the erasing of ignorance and error and to the education of responsible citizens," the Institute grew slowly for a decade. In 1859 it was formally organized as Trinity College, which laid solid foundations for the future. When the college moved to the growing city of Durham in 1892, it was able to find increased support both from the church and from individuals who were dedicated to the aims of liberal education. During the next three decades Trinity College drew to its faculty men of imagination, courage, and intellectual achievement who, in an atmosphere of academic freedom, created a notable liberal arts college.

The transition from college to university dates from James B. Duke's Indenture of Trust in 1924, through which Duke University came into being. The core of the new University was already in existence. This was Trinity College, which was joined in the ensuing years by three other undergraduate colleges, the Woman's College in 1925, the College of Engineering in 1939, and the School of Nursing in 1953. In the meantime, a number of professional schools were established as part of the total University structure. In hardly more than a generation Duke University was to attain a position of educational leadership and importance, both regionally and nationally, one of the remarkable stories in American higher education.

The undergraduate colleges exist as important parts of the University which, by modern standards, is moderate in size: they enroll about 4000 students in the total population of about 6500. Though they share the same campuses with the professional schools and many of the same facilities, and participate in the wide range of activities and educational advantages possible in a university environment, each of the colleges has its separate identity; yet each is related to the others and to the University as a whole.

From college to university the basic principles have remained constant. The University motto, *Eruditio et Religio*, reflects a fundamental faith in the union of knowledge and religion, the advancement of learning, the defense of scholarship, the love of freedom and truth, a spirit of tolerance, and a rendering of the greatest service to the individual, the state, the nation, and the church. Through changing generations of students the objective has been to encourage each individual to achieve to the extent of his capacities an understanding and appreciation of the world in which he lives, his relationship to it, his opportunities, and his responsibilities.

The undergraduate colleges of Duke University are concerned with developing the whole person. In classrooms, libraries, laboratories, gymnasias and sports fields, and in the Chapel and religious program, they are concerned with his growth and well being in all aspects of life: mental, moral, physical, social, and spiritual. Although the University has always been closely associated with the Methodist Church, it welcomes students of all faiths and encourages them to develop their spiritual lives in accordance with the tenets of their own creeds. The need of training for specialized professions and employments is recognized, but such training is incidental to a larger purpose. Through the variety of the subject matter, the insistence on a common core of fundamental courses, and an emphasis on a more intensive study of some selected subject, the colleges seek to give their students a knowledge and appreciation of world culture and at the same time provide a foundation for careers.

Location

Duke University is situated in Durham, North Carolina, a city of about 80,000 population, 250 miles southwest of Washington, D.C., and 400 miles northeast of Atlanta, Georgia. From Washington, New York, and New England it may be reached by trains of the Seaboard Railroad into Raleigh and by frequent buses from there to Durham, or by air travel via Eastern, Piedmont and United Air Lines. From the south and southwest both train and air services are available and frequent. From the Ohio Valley and the middle west frequent direct air travel is available

via Eastern Air Lines from Chicago, Detroit, Cleveland, and via Piedmont Airlines from Cincinnati and Louisville. By motor, Durham may be easily and pleasantly reached by a varied network of Federal and state highways, chiefly U. S. 15, 501, and 70, and Interstate Highway 85.

The West Campus is located on a tract of nearly 8,000 acres of rolling, wooded land on the southwest fringe of the city. The East Campus is about a mile distant, within the city, on its own campus of 110 acres. The University is an active participant in the nearby important and expanding Research Triangle of North Carolina.

The Faculty

It is the policy of the University to secure and to maintain a faculty of high competence in both teaching ability and research activity. In times of such rapid and far-reaching changes as we live in, teachers must ever be aware of new ideas, new climates of thought, new discoveries, whether they be in the sciences, in literature, or in philosophy. Their interest in the capacity for original investigation and their contribution to the ever-developing body of human knowledge help to bring to life the materials which they teach and to communicate to the college student both the excitement and the essential significance and value of learning. This double function of the scholar-teacher tends to ensure the broadest and deepest experience available to students. All ranks in the instructional staff are assigned to the beginning as well as to advanced students.

Beyond the physical limit of the classroom many opportunities exist for those students who wish and can utilize, for their own educational purposes, informal and friendly relationships with faculty members. These may be established through the regular advisory system, through extracurricular informal discussion groups and through identity of interests.

The Student Body

In establishing his educational trust in 1924, Mr. Duke requested that "great care and discrimination be exercised in ad-

mitting as students only those whose previous record shows a character, determination, and application evincing a wholesome and real ambition for life." Within the spirit of this request the admissions officers seek those students whose records and aptitudes promise a successful college experience and "who evince a wholesome and real ambition for life." Although its physical setting is in the Southeast, about half of the student body come from other sections of the nation and from foreign countries.

The University actively seeks to enroll students from a variety of different backgrounds and experiences, students possessing some special talent evolving from a passion for learning, and students who are concerned with and about the issues of today and tomorrow. Such a broadly representative group of students, chosen on merit through a selective process, ensures a cross-section of social, economic, and religious background which provides a stimulating variety in attitudes and a consequent cosmopolitan atmosphere. Such variety itself serves an important educational purpose as provincial attitudes and prejudices erode away under the mutual respect and understanding engendered by the social and intellectual interchange possible in a large, varied student body. While high scholarship always remains an important criterion in the selection of students, it is in no instance the sole measure of a student's potential success in the colleges.

Libraries and Laboratories

Since much of the educational work of a college is accomplished through books, excellent libraries become one of the most important elements in the college experience. Indeed, it may well be maintained that the library is the central, indispensable core of an educational institution. Early recognition of the need for great collections has enabled Duke to create a library of significant size and quality. The University library now ranks among the first 19 university libraries in the country, with collections totaling 1,750,000 books and over 3,000,000 manuscripts. In addition and as part of the main collection, there are numerous school and departmental libraries: the Woman's College library, situated in the center of the East Campus, contains 150,000 volumes and periodicals; the College of Engineering library,

35,000 specialized volumes; the Biology-Forestry, 87,000; Physics-Math, 29,000; Chemistry, 22,000 volumes.

As important as books are, they are not alone sufficient for a broad education in the modern world. Laboratories, equipment of all kinds, apparatus for teaching and research—these too are of great importance. Whether it be one of the Van de Graaff accelerators for work in nuclear physics, modern sensitive testing machinery for some phase of engineering, equipment for building new research devices on the frontiers of electronic experiment, digital computers for complicated mathematical formula, micro-photographic apparatus for study of cell growth and decay, or the modern language laboratories for speech study and correction—all make their contributions to the complete education of the college student.

Admission

New students are admitted for the academic year at the opening of school in the fall.

The size of the entering classes is approximately as follows: Trinity College, 600; Woman's College, 350; College of Engineering, 175; the School of Nursing, 95. Since five thousand candidates normally apply and enrollment is limited, the Committee on Admissions selects those students who in its judgment are best qualified to benefit from the opportunities which the colleges offer. Selection is based not only upon academic grades and test scores but also upon recommendations of school officials and other personal criteria.

Although there are no inflexible subject matter requirements, at least fifteen acceptable units of secondary school credit must be presented. Of these at least twelve must be in college preparatory subjects: English, foreign language, history and social studies, mathematics, and physical or biological sciences. Applicants for the College of Engineering are advised to present four units of mathematics and at least one unit in physics or chemistry.

Students applying for admission are required to take the Scholastic Aptitude Test, the English Composition Test, and two other achievement tests of their own choosing given by the College Entrance Examination Board. It is recommended that an applicant who has had two or more years of a foreign language in secondary school take the achievement in that language. The foregoing recommendation is not applicable to candidates for the College of Engineering. *The Writing Sample is not considered an achievement test and will not be accepted as a substitute for any of the above mentioned tests.* Candidates applying to the College of Engineering must include the appropriate mathematics test.

While the Achievement Tests are used initially for admission, the test results may subsequently be used for course placement purposes. The student planning to continue the study of a foreign language may wish to submit the foreign language achievement test for placement purposes.

Prospective students are urged to broaden their reading outside of class during their senior year and to make the acquaintance of books and magazines that do not form part of the subject matter of their courses. At the same time, they should take every opportunity to increase their competence in writing. Those who cannot write simple, clear, grammatical English prose will be progressively at a serious disadvantage in the competition for admission and also in the general work of the freshman year. Careful attention to correctness in English in correspondence and on application blanks cannot be too seriously stressed for candidates for admission.

Early Decision Plan

For the well-qualified student who has definitely decided to enter Duke if accepted, the University offers to reserve a place by "early decision" on December 1 of the student's senior year in secondary school. The deadline date for completing applications for early decision is November 1. Interested students should write to the Office of Admissions for detailed information.

Regular Admission

Candidates for regular admission must apply no later than January 15, and normally do so during the fall of the senior year. For this group, decisions are mailed on April 15.

Application forms and instructions regarding procedure and necessary documents to be included will be sent upon request to the Office of Admissions, Duke University, Durham, North Carolina—27706. A non-refundable processing fee of \$10.00 must accompany the submission of the full application form.

Admission to Advanced Standing

Admission by transfer from other institutions may be arranged for a limited number of students, under certain well-defined regulations. All such candidates must submit official transcripts of all work completed at other colleges, accompanied by a statement of honorable dismissal, and scores on the Scholastic Aptitude Test of the College Entrance Examination Board. An overall grade average of at least C must have been earned on work previously

completed; courses on which a grade less than C has been earned cannot be accepted for transfer credit. Students will not be considered for transfer beyond admission to the junior class. Further detailed regulations for admission by transfer may be obtained from the Office of Admissions.

A small number of special students of mature age may be admitted for such courses of instruction as their earlier training and experience may qualify them to take. They may not be accepted, however, as candidates for a degree in a regular course unless they are able to meet all normal requirements for admission which apply to all beginning students.

Former students who have for various reasons withdrawn from college and who wish to continue their collegiate careers should apply to the Office of Admissions, with a detailed account of their activities since withdrawal from college.

Advanced Placement and Credit

In order to recognize superior preparation on the part of entering students the colleges have arranged for course placement on the basis of good performance on either the Advanced Placement Examinations of the CEEB or—to a more limited extent—on placement tests given by the colleges during Orientation Week. The College Board Advanced Placement Examinations are a vehicle to sophomore-level or higher placement in botany, chemistry, English, French, German, history, Latin, mathematics, physics, Spanish, and zoology, while the Duke tests are used to decide placement only in foreign languages and mathematics. A further distinction is that only the A P Examinations may lead to credit toward graduation for the course or courses omitted. Through sophomore-level placement a student is able to broaden the base of his elective courses or the depth of his study in his field of concentration in subsequent years of his college experience.

ADVANCED PLACEMENT COURSE CREDIT: Any student who has earned a score of 3 or higher on an Advanced Placement Examination of the CEEB and is approved for placement in a sophomore-level course or above may be considered for course credit in appropriate subjects. For those presenting scores

of 4 or 5 the award of credit will be made automatically upon matriculation; for those presenting scores of 3 it will be determined with the approval of the University department concerned, no earlier than the end of the first semester. Course credit may be granted for one or two semesters in each subject area in which examination is offered in the Advanced Placement Program.

It is recognized that many secondary schools are not engaged in the Advanced Placement Program. However, any secondary school student may after adequate preparation on his own initiative apply to the College Entrance Examination Board to take one or more of the Advanced Placement Tests. Such test results may be submitted to the dean of the college and will receive the same consideration.

College Expenses

Each student going to college should analyze carefully his financial situation. In making such an analysis it should be recognized that the primary responsibility for defraying the cost of an education lies with the student and his family. The typical college student can depend upon some contribution from his family's current income, a proportionate share of family savings, and anticipated income from summer employment. The number of years of study contemplated and the number of dependent children in the family should be considered in computing the funds which will be available in a particular year.

Fees paid by the students cover only a part of the cost of their instruction and of the operations of the University. Income from endowment and contributions from the alumni, alumnae, and other public-spirited men and women meet the balance, which constitutes more than half the total cost.

Estimated Expenses for an Academic Year

Certain basic expenditures are to be considered in preparing a student's budget, such as tuition, the general fee, room and board.

Incidental expenses, clothing, and travel depend to a large extent upon the tastes and habits of the individual. It is realistic to suggest that the average Duke student will spend at least \$400.00 annually for incidental items, including sundry clothing purchases and organizational dues. Travel costs and major expenditures would have to be added to these estimates.

The estimated necessary expenditures are as follows:

<i>Undergraduate Men</i>		<i>Undergraduate Women</i>	
Tuition	\$1,250.00*	\$1,250.00*	
General Fee	187.00*	187.00*	
Room Rent	310.00*	335.00*	
Board	550.00 (Cafeteria estimate)	500.00 (Board rate)	
Miscellaneous Expenses	443.00	70.00	
Books and Supplies	70.00 (Moderate estimate)	443.00* (Moderate estimate)	
Totals	\$2,810.00	\$2,785.00	

* Although these amounts are based upon present existing charges, they are subject to change. The prospective student should contact the Office of Admissions for more current information.

It should be noted that the General Fee is a charge which represents the total of the student health, publications, athletic, library, damage, Student Union, and other fee charges.

An initial, non-refundable registration fee of \$20.00 is charged all new students. This fee as well as the required \$50.00 deposit is paid upon acceptance into the University. One-half of the deposit serves as a continuing room deposit for succeeding semesters, and the other half serves as a continuing reservation deposit.

Since the undergraduate colleges are residential colleges, all students except day students living at home are required to live in the residence houses. The majority of the rooms on both campuses are double rooms occupied by two students. A limited number of single occupancy rooms are available.

Dining facilities on the West Campus include three cafeterias with multiple-choice menus, and the Oak Room, where full meals and *à la carte* items are served. On the East Campus, resident undergraduate women board in dining halls at a fixed fee of \$450.00 per academic year.

Financial Aid

The colleges are interested in students of ability and ambition; the total charge should not be a deterrent to those students who are unable to defray the entire cost of their education. Assistance is made available to qualified students through awards, scholarships, loans, and grants. Scholarship and loan funds, including those provided in the National Defense Education Act of 1958, provide help for about 30% of each entering class. Part-time employment in various divisions of the University often supplements this amount for the particularly needy student, or provides modest help for the student not on scholarship or loan funds. Over one thousand undergraduate students in 1963-64 received assistance totalling about \$1,350,000.

Specific awards included the following:

Thirty-one Angier B. Duke Memorial Scholarships, with a value from \$200 to \$2600. They are awarded to men and women on a basis of merit. Though granted for one year, they are renewable from year to year so long as the student does satisfactory work.

Four W. N. Reynolds Memorial Scholarships, ranging in value up to \$2600, are awarded on merit to children of employees of the R. J. Reynolds Tobacco Company, its subsidiaries and affiliates, and to residents or natives of North Carolina. They are renewable annually on the basis of satisfactory performance.

Two Mary Duke Biddle Scholarships in Music Composition at a fixed stipend of \$2500 per student are available to each entering class. They are renewable from year to year so long as the student does satisfactory work. The student wishing to apply for this award will proceed in the normal manner but be required to submit samples of his musical compositions. Eligibility is limited to students desiring to major in music.

A number of National Methodists Scholarships, valued at \$500 per year, are available on a basis of demonstrated need to Methodist students who have given evidence of leadership in their local Methodist Youth Fellowship Groups.

Students preparing to enter full-time religious work are eligible to supply for Christian Vocations Scholarships on the basis of need. Students approved are required to sign a note each semester for the amount of financial assistance granted to them. These notes will be cancelled upon evidence that the student has entered full-time Christian work after graduation.

Scholarships from industry, ranging in value from \$200 to \$2,000, are awarded to students with excellent academic records, and are renewable for each of the years of undergraduate study.

Eleven Duke University School of Nursing Scholarships, valued at \$200 to \$1,200 per year for a maximum tenure of two years, are awarded to young women in the entering class.

Details of all scholarships and other financial aids may be obtained from the Office of Admissions.

Residence Houses

On the East Campus ten residence houses accommodate a student-body of somewhat over 1,100 women. Each has a standard organization, consisting of a Counselor, who is a member of the Dean's staff and who lives in the house as an adult adviser, and the student House Government committee. The latter accepts responsibility in helping provide an agreeable climate for successful dormitory life. To each house are assigned students from all four classes, about 30 places in each being reserved for freshman women.

Designed in Georgian style, the residence houses form a large part of the central quadrangle of the woman's campus. They are carefully arranged for modern dormitory living, with provision for parlors, small appointment rooms, laundry rooms, kitchenettes, and other amenities for pleasant living.

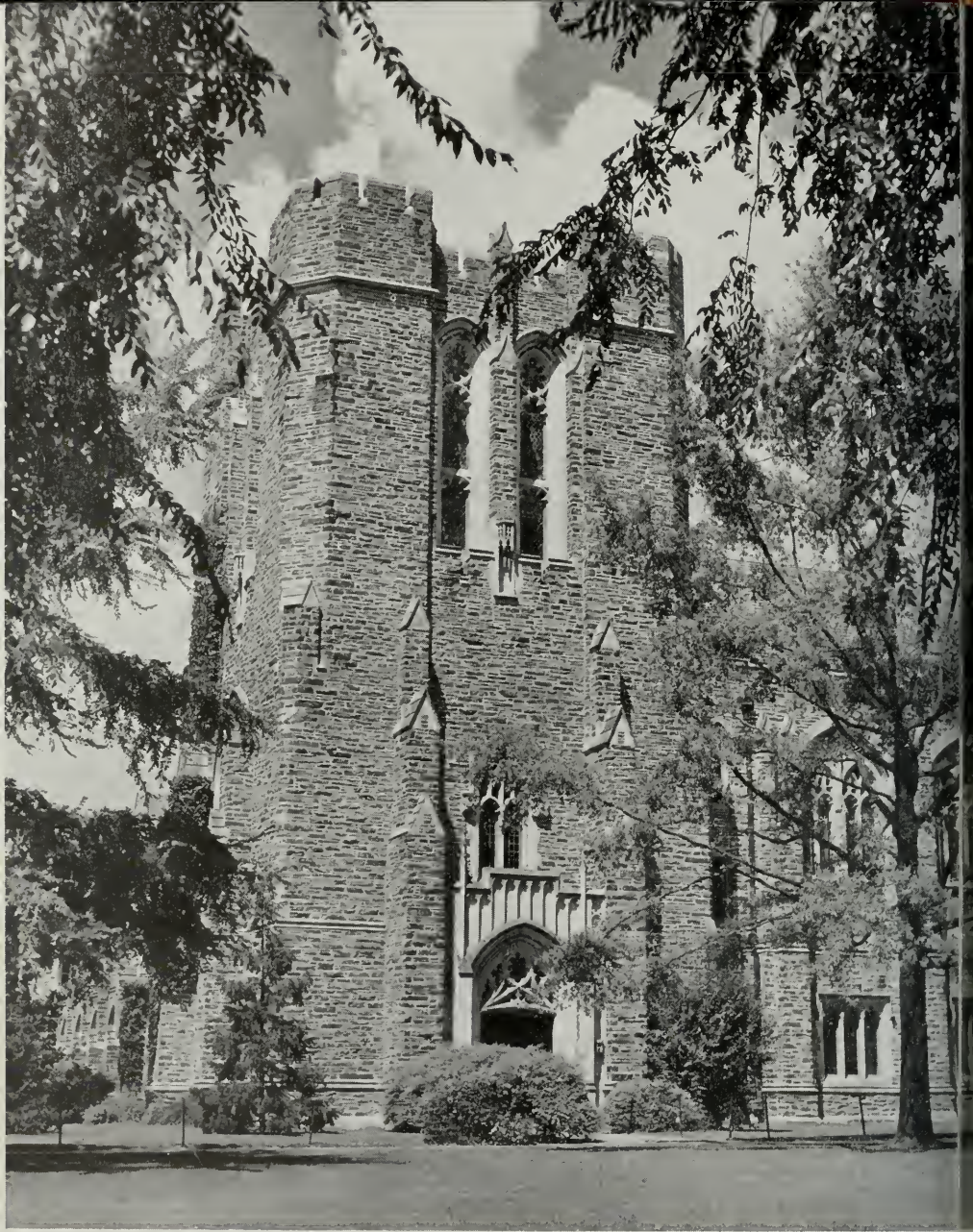
On the West Campus some 2,200 men are housed in four Quadrangles—Craven, Crowell, Few, and Kilgo, and in Wannamaker Hall. Freshmen are housed in freshman houses or in special houses with upperclassmen. In the freshman houses there are housemasters; in each cross-section and special living group there is a resident fellow. Fraternity men live in separate sections of the residence halls.

Special Living Groups

Special living groups are available for approved undergraduate men. These are designed to bring students with a broad range of interest into a congenial group. A member of the academic community who is qualified by interest and experience to serve as mentor of the group lives with them. The aim is to provide a setting that will stimulate self-government and an intellectual program to supplement each individual's effort to develop his full potential.

Right—Duke Chapel is the dominating structure of the West Campus.





Entrance to the Duke University Library, center of a complex that contains one and a half million volumes.



Above—a view of the undergraduate men's dormitory area.

Below—Front and one wing of the College of Engineering Building.





Above—The Alice M. Baldwin Auditorium on East Campus.

Below—One of the Woman's College residence houses.



The Curriculum

Undergraduates at Duke may pursue a course of study leading to one of the following degrees: Bachelor of Arts; Bachelor of Science; Bachelor of Science in Civil, Electrical or Mechanical Engineering; and Bachelor of Science in Nursing. The Bachelor of Arts degree is offered with major concentration in: accounting, art history, art design, botany, business administration, chemistry, economics, education, English, French, geology, Greek, German, health and physical education (women students only), history, Latin, mathematics, music, philosophy, physics, political science, psychology, religion, Spanish, Russian, sociology, and zoology. The Bachelor of Science degree is offered with major concentration in: botany, chemistry, geology, mathematics, physics, psychology, and zoology.

The requirements for the degree of Bachelor of Arts include a broad distribution of studies among representative fields of culture, concentration within a special field, and some work of the student's own choice. The Bachelor of Science degrees require a heavier concentration in science or professional subjects, but are designed to encourage the inclusion of a maximum of liberal studies. In either case, the Duke student has available courses of study that provide a basic breadth of learning in several disciplines and a deepening study of his chosen specialty.

The philosophy of Duke is that the primary and continuing function of university education is to assure maximum training and development of the intellectual power of the individual student. Basic to this is our faith in the power of a liberal education to provide a foundation for the cultivation of leadership in both the specialist and the generalist. The curriculum provides that the student acquire an acquaintanceship with his own heritage and develop tools with which to work. Having these, he may hopefully advance toward the discovery and development of his highest talents.

Planning for the Future

Many students enter college with definite career objectives. After a period of time, however, some discover that they have lost their early interests in favor of others that appear more congenial to their aptitudes. Other students enter with only vague notions of a future career. A liberal arts course will serve all of these students, especially in the beginning years.

The student can gain more from his undergraduate college experiences if he plans his program in such a way as to achieve certain life goals and career objectives. The University Counseling Center provides professional counseling services designed to assist the student in clarifying life goals, selecting career objectives, evaluating talents and interests, and planning programs of study which will lead to the achievement of appropriate and realistic objectives. The Center is also the authorized testing center for most national testing programs which may be required for admission to graduate or professional schools, or for qualification for graduate and professional school scholarships.

Graduate Study

Students who may look forward to entering graduate or professional schools for work leading to advanced degrees will find that a broad liberal curriculum is normally adequate background and that an excellent academic record is essential. The student should inform himself of the requirements for the particular institution which he wishes to enter so that his program can be planned accordingly.

HONORS-MASTERS PROGRAM

This program, which is made possible partly by a grant from the Ford Foundation's Fund for the Advancement of Education, aims at the recruitment and accelerated preparation of college and university teachers. Academically superior undergraduates are selected by the Honors-Masters Committee during the spring of their sophomore year. During the junior year, these pre-graduates are enrolled in Colloquium 101, 102; normally the pre-graduates will be candidates for graduation with distinction in their major departments. Emphasis is also placed on the acquisition of

reading knowledge of two satisfactory foreign languages prior to the beginning of graduate work. Summer school scholarships as well as a limited number of first-year graduate scholarships are available.

LAW

No particular course is prescribed for the pre-legal student. He will want to choose his major fields of concentration, however, from those disciplines which offer him a broad general education in various fields of thought. Among these are political science, economics, history, philosophy, sociology, psychology, and English. It is essential that the prospective lawyer be highly skilled in the use of both spoken and written English. Training in public speaking and participation in debating activities will add much to his preparation for law.

MEDICINE AND DENTISTRY

Students who look forward to courses in medicine or dentistry should seek early advice upon the necessary course of study for admission to the school of their choice. All medical schools require basic courses in chemistry, physics, zoology, and mathematics. Although it should be emphasized that the pre-medical student need not major in science, the non-science major should make certain that he include in his program those advanced courses beyond the basic level that his adviser deems essential. He will also find it advisable to take more than the minimum requirements in certain other areas.

THEOLOGY AND RELIGIOUS EDUCATION

Those students who intend to enter the ministry or to follow some other religious vocation should have a broad liberal arts background. Toward this end, they should include in their programs course work in English, literature, history, philosophy, psychology, and sociology, as well as courses in religion. A concentration in one of these fields is recommended.

ACADEMIC-PROFESSIONAL PROGRAMS

Students who wish to combine the liberal arts work with a beginning year of professional school study in their senior year

should investigate the academic-forestry and academic-law programs. The provisions enabling a senior to elect the work of the first year in a professional school of the University applies solely to eligible students in Trinity College or the Woman's College. This privilege of completing the combined course of the degree is available only if the student is admitted to the professional school at the close of his junior year. A student thus admitted registers as a senior in his college and as a first-year student in the professional school.

TEACHING

The programs in the undergraduate colleges for those who wish to teach are designed to prepare both elementary and secondary school teachers. Since certification requirements vary from state to state, early advice and counseling from the faculty of the Department of Education will be well worth while.

ACCOUNTING

Students who plan to qualify to take the Certified Public Accountant's examination have available a specialized program which requires, in addition to the normal minimum requirements for graduation, certain specific courses in economics and in accounting to be taken in a required sequence.

BUSINESS

Duke students enter business careers from a variety of academic programs. There is available a Business Administration Program which requires, in addition to the normal minimum requirements for graduation, certain courses in economics, business administration and accounting to be taken in a required sequence.

ENGINEERING

The College of Engineering offers programs of study leading to the Bachelor of Science degree in Engineering, with an opportunity for a major in Civil, Electrical, and Mechanical Engineering. The engineering curriculum at Duke is built upon the sound basis of mathematics and the physical sciences, but the engineering student selects a number of courses in the liberal arts and is a member of a community with a liberal arts tradition.

Men and women planning to pursue an engineering pro-

gram should enroll as freshmen in the College of Engineering, although its freshman program is not unlike that of the other undergraduate colleges. Transfer into or out of engineering often can be accomplished with a minimum of difficulty before the beginning of the sophomore year. Students considering engineering as a possible career, regardless of the undergraduate college in which enrolled initially, should make it a point to select the appropriate mathematics and physics courses during the freshman year.

The ROTC

Through Naval and Air Force Reserve Officers Training Corps programs the University is cooperating with the Department of Defense in providing officers for the active and reserve forces of the nation.

There are two basic programs in the Naval ROTC through which students can qualify for Naval commissions upon graduation: one, the Regular NROTC program, provides a maximum of four years in the University largely at government expense, followed by a commission in the regular Navy or Marine Corps; the other, the Contract program, leads to a commission in the Naval Reserve or the U.S. Marine Corps Reserve.

The Regular Student. Appointments are made on the basis of an annual nationwide test and selection procedure. Students selected are appointed Midshipmen, USNR, and receive four years tuition, fees, and textbooks at government expense plus retainer pay at the rate of \$600 per year. The regular midshipman may take any course leading to baccalaureate or higher degree with certain exceptions, e.g., pre-medicine and medicine, pre-theological and theological, music and art. He participates in two summer training cruises aboard ship and receives aviation and amphibious indoctrination at naval shore stations during one summer. Upon graduation he receives a commission as Ensign in the Regular Navy, or Second Lieutenant in the Regular Marine Corps. The minimum period of active commissioned service is four years for regular officers.

The Contract Student. The contract student is selected from freshmen regularly enrolled in Duke University who desire to qualify for a commission in the Naval or Marine Corps Reserve while pursuing their normal courses of study. He has the status of a civilian who has entered into a mutual contract with the Navy and is not eligible for the benefits and retainer pay received by regular midshipmen. He is paid a subsistence allowance during his last two years in the NROTC, however, amounting currently to forty dollars a month. He goes aboard ship for

one summer training cruise, normally between his junior and senior years. Upon graduation, he is commissioned in the Naval or Marine Corps Reserve and reports for active duty. Minimum period of service for both the Navy and the Marine Corps is three years.

Both Regular and Contract midshipmen are deferred from Selective Service by virtue of their commitment to serve on active duty after graduation. The Navy furnishes necessary uniforms and equipment.

THE AIR FORCE RESERVE OFFICERS TRAINING CORPS: The unit functions as a regular department of instruction known as the Department of Aerospace Studies. It selects and trains students who possess the requisite character, intelligence, desire, and sense of duty to become Air Force officers.

For enrollment in the Basic Course (freshman and sophomore years) the student must be a male citizen of the United States; be physically qualified under standards prescribed by the Air Force; be accepted by the institution as a regularly enrolled student and must meet other stated requirements.

For enrollment in the Advanced Course the student must have successfully completed either the Basic Course or the six weeks Field Training Course, or have had at least one year of honorable service in the Armed Forces of the United States; must execute a written agreement with the government to complete the Advanced Course; must be sworn into the Enlisted Reserve; and must agree to accept a commission in the United States Air Force Reserve upon graduation.

Those selected for the advanced course are furnished uniforms, texts, training equipment and are paid approximately \$900 for the two years of the Advanced Course. Each advanced student will attend a summer training unit, at Government expense, normally between his junior and senior year.

Student Life

Social life within the undergraduate colleges embraces so many kinds of student relationships that only a partial impression of it can be conveyed. Students of many diverse backgrounds and experiences offer both a great variety of individuality and at the same time a desire and need for community and identification. Some of this is met by common academic requirements and experiences, yet it is fair to say that most of it is gained through extra-academic affiliations. Properly, the earliest and in some respects the strongest is the class identification. In many ways the Freshman Class is the most cohesive of the four undergraduate classes, and it is during this first year that the beginning student finds his friends and associates for his college career and makes the social affiliations which will lead him into the campus life of the coming years.

Although the campuses for men and women are geographically separated, social life and college life are essentially co-educational. Each campus has its own student government association, its own inter-social councils, its own local and individual groups. All of these meet at many points for inter-college life. Women and men jointly serve on boards and councils that are concerned more with the social side of college life than with the strictly academic.

Fraternities and sororities offer to some students benefits of a social affiliation during the years of college, but offer little of interest to many others. There are eighteen national fraternities on the West Campus: Alpha Tau Omega, Beta Theta Pi, Delta Sigma Phi, Delta Tau Delta, Kappa Alpha, Kappa Sigma, Lambda Chi Alpha, Phi Delta Theta, Phi Kappa Psi, Phi Kappa Sigma, Pi Kappa Alpha, Pi Kappa Phi, Sigma Alpha Epsilon, Sigma Chi, Sigma Nu, Tau Epsilon Phi, Theta Chi, and Zeta Beta Tau. All of these occupy sections in the dormitory quadrangles that include chapter and meeting rooms. No separate dining facilities are provided for fraternities; the members board in the University dining halls. About half of the total men students join fra-

ternities, and both fraternity and non-fraternity groups contain respected and prominent members of the student body. Deferred rushing has been in effect for some years, and freshmen may not be asked to join fraternity groups until the beginning of the second semester of their first year. Rules governing the conduct of fraternity affairs are made by the Inter-fraternity Council and administered by the Judicial Board of that body.

In the Woman's College thirteen national sororities have established chapters on the campus: Alpha Chi Omega, Alpha Delta Pi, Alpha Phi, Alpha Epsilon Phi, Delta Delta Delta, Delta Gamma, Kappa Alpha Theta, Kappa Delta, Kappa Kappa Gamma, Phi Mu, Pi Beta Phi, Sigma Kappa, Zeta Tau Alpha. No separate dining facilities are available to sororities; members board along with all other students in the two dining halls on the campus. Sorority affairs are under the supervision of the Woman's Pan-Hellenic Council, which serves these organizations much as the Men's Inter-fraternity Council serves the fraternities.

In addition to the purely social fraternities, numerous national honorary societies have chapters on the campus. These include groups in economics, German, classics, education, psychology, social science, mathematics, engineering, political science, Spanish, physics, French, science, and in service, forensics, leadership, scholarship, and pre-ministerial. There are also numerous local honorary orders for both men and women in scholarship, leadership, athletics, medicine, and engineering.

Religious Life

Eruditio et Religio, the motto emblazoned on the seal of the University, proclaims belief in the essential union of knowledge and religion in the educational process. The Gothic Chapel stands at the center of the campus, an inspiring symbol of the place of religion in the well-balanced life. The Chapel program encourages the cultivation of the moral and spiritual life of students.

In the University Service of Worship on Sunday morning two hundred students participate by singing in the choir; at least one hundred other students aid in special ways, as ushers, collectors, and assistants in the communion services.

Opportunities are provided through the Chapel and its related activities to translate worship into effective Christian living. Denominational, interdenominational, and interfaith loyalties are emphasized. Protestant, Roman Catholic, and Jewish students are organized in their respective groups, each having a denominational chaplain or adviser.

The University Religious Council, composed of students and faculty, promotes the interdenominational religious life in its many facets. The work of the Council and of the denominational program is under the supervision of the Chaplain to the University, who is also Director of Religious Life. He, with two Associate Directors of Religious Life and five denominational chaplains, coordinates the religious program of the campus. They also offer personal guidance and spiritual counsel to all students in matters related to their faith.

The Dean of the Chapel is a key figure in student religious life. A regular preacher to the University, he preaches in the Chapel each month. He serves as an officiating minister and participates in the planning of the University's religious program.

Additional opportunities for the enrichment of the student's religious life are offered in organ and carillon recitals, choral concerts, other special services held from time to time, and in the sermons of distinguished guest preachers from many lands who are heard in the Duke Chapel. Some students, at their own discretion, participate actively in the programs of the downtown churches of their choice.

Separate in organization, yet coordinated in aims, are the YWCA and YMCA, both active organizations whose many members are concerned both with social work in the community and in varied programs integrated with campus needs. From the Freshman Advisory Council to help new students at their first arrival on campus to arrangements for Parent's Week-Ends, from sponsoring vesper services and meditations to organizing panel discussions on topics of contemporary interest and significance, the two groups make their influence felt throughout the colleges.

Music, Speech and Dramatics

Students who have developed interests in music, either as performers or spectators, will find many opportunities to indulge

their interests. Competent musicians can find artistic groups which they may join: the symphony orchestra, the chamber orchestra, the concert band, the brass ensemble, the marching band for men. All of these organizations are professionally directed, and most are devoted to the study and performance of serious music. For those who express themselves by singing, more groups are available. The Chapel Choir, composed of two hundred men and women, and the Woman's and the Men's Glee Clubs regularly give several concerts a year. A smaller group of trained voices, the Madrigal Singers, emphasizes research for and performance of unusual ensemble music. English and Italian Madrigals, French Chansons, and contemporary compositions are performed *a cappella* in campus and city programs. A new group, The Chancel Singers, has been organized for a select group of sixty men and women for the performance of challenging music. Programs have included Bach, Brahms, Pergolesi, Gabrielli, and Franck. The varied musical programs offered by such strictly student groups are supplemented by the Chamber Arts Society, which brings to the campus the best chamber music ensembles from this country and abroad; by the Duke Artists' Series, which sponsors the appearance of symphony orchestras, chorale groups, individual artists, ballets; and by the Duke Student Union, which sponsors many free concerts and recitals and maintains a classical record library for student use.

Students who take pleasure and satisfaction in speech and dramatics will find stimulating outlets for their talents. The Debate Council provides qualified students a chance to develop analytical and logical thinking in formal and informal discussions and debates. The varsity debate team has for many years established an excellent record in intercollegiate debating, both regionally and nationally. The presence on the campus of WDBS, a very active college radio station, provides experience in production, business management, engineering, and sales. The station broadcasts for more than eighteen hours a day and enlists a large audience on both campuses.

Creative dramatic experience is well supplied by the Duke Players and Hoof 'N' Horn. For many years the Players have put on distinguished productions of classical and modern plays.

Using both arena style production in their own theatre, and proscenium style in the University auditorium, the organization presents three major plays every year, and a number of experimental plays and readings. Aspiring playwrights have a chance to see their own work produced. Indeed, all aspects of design, lighting, business management, writing, and acting are available to all undergraduates of the Colleges. Hoof 'N' Horn, a younger organization, directs its attention to an annual production of a musical comedy. Student writers, composers, arrangers, directors, designers, dancers, singers, and technicians cooperate to produce highly original and diverting shows.

Publications

On every college campus student publications provide a direct and valuable opportunity for student literary expression and become thereby an adjunct to the educational process. Both men and women undergraduates find exciting and stimulating experiences working on the numerous publications issued at Duke. All publications are under the supervision of a Board composed of representatives of students, faculty, and administration. The *Archive*, a literary magazine, publishes student creative writing in fiction, poetry, essays, reviews. Throughout a long life it has maintained a high quality of literary expression, and many of its student contributors have in their maturity justified their early literary promise. The *Chronicle*, the student newspaper—"The tower of campus thought and action"—has served for more than a half century as the forum of student opinion. Published twice a week, it is consistently rated high by national college press associations. The *Chanticleer*, the year-book, serves as a review of the school year, and records in text and pictures the individuals, organizations, and events that have academically and socially contributed to the college experience. The *Peer*, a quarterly magazine, is devoted to collegiate life and interests and contains stories of general interest, essays, and cartoons. Another quarterly, the *Duke Engineer*, appears under the auspices of the students in the College of Engineering. Semi-technical in nature, it provides articles by students on new de-

velopments in the profession, news of engineering societies and their activities, and local items of interest to engineers.

The Student Union

In addition to these, but not duplicating them, is the Student Union. Efficiently organized and directed it is dedicated to stimulate, promote, and develop the social, recreational, educational, and spiritual activities of all students. To fulfill its large purpose, the Student Union operates broad and expanding programs of many kinds. Since it is student-centered, it utilizes the talents and energy of several hundred undergraduates in affecting its programs. Housed in Flowers building, it maintains lounges, Hi-Fi record collections, game rooms and offices for student organizations. Through its many committees, the Union arranges art exhibitions, photographic displays and contests, promotes bridge clubs, arranges sings, dances, and get-togethers. It sponsors major attractions, such as plays by professional groups, distinguished speakers, and prominent musical and dance groups. Through its Educational Affairs Committee it promotes symposia on questions of general interest and importance which draw to the campus figures of national and international eminence.

Physical Education

All undergraduate students are required to engage in some type of physical education for four semesters. For men this work consists of participation in natural, practical, physical activity for at least three one-hour periods each week. The purpose is to improve body control and strength to stimulate the development of mental and physical alertness, to establish habits of regular exercise, and to give training and experience in various kinds of recreational sports which the student can enjoy during and after college.

In addition to the required work in physical education, the student may choose, on a voluntary basis, to engage in the well-developed intramural program, which embraces a dozen sports and enlists the participation of a large percentage of the men students. In a typical year more than 2,000 students on many fraternity, dormitory and organizational teams participate in

tournaments to compete for more than fifty trophies. The program is deservedly popular because it enables every student to choose the sport he most enjoys and because students themselves serve as their own managers.

The program of the Health and Physical Education Department of the Woman's College is designed to give the women students an appreciation of the value of activity for general physical well-being, skill in one or more activities which can be enjoyed as recreation during and after college, a well-developed and well-coordinated body, and a knowledge of good posture and efficient handling of the body in everyday activities. Through individual conferences following the testing program of Freshman Week, entering students are assigned to special kinds of classwork as needed, such as swimming, posture, fundamentals of movement, rhythm, or sports. One course in dance is required of all students, and swimming is required for all who are unable to pass the swimming test. During the two years of required physical education, students elect their courses from a large number of activities including individual, dual, and team sports, aquatics, conditioning exercises, and several types of dance.

The dance group, the swimming club, and the other sports clubs of the Woman's Recreational Association give opportunities for each student to take part in the types of intramural activities most interesting to her. The swimming pool, tennis courts, bowling alleys, and other athletic equipment are available to all students for use at specified times.

In order to maintain certain hygienic standards of physical education and intramural athletics, the University has made available for all students the necessary uniforms, facilities and laundry services.

Intercollegiate Athletics

The intercollegiate athletic program is controlled entirely by the University through the Athletic Council composed of seven members from the faculty, administration, and alumni groups. Representative freshman and varsity teams are trained in football, basketball, baseball, track, cross country, golf, soccer, lacrosse, swimming, tennis, and wrestling. Schedules are arranged

to include both the schools in the Atlantic Coast Conference, of which the University is a member, and others in the South, North, East, and Middle West. Football and basketball are always the most popular spectator sports. The less popular sports, however, have their devoted followers, and over the years many excellent teams have represented the school, and athletes of note have been developed.

Student Health

The Student Health Program is closely related to the Teaching Hospital of the Duke University Medical Center. This arrangement provides an unusually comprehensive service, available at all times. The cost, for regularly enrolled students, is included in the general fee paid each semester, and in the fees charged each student in the summer quarter.

The service is under the direction of the University Physician with the cooperation of the Staff. It includes hospitalization in Duke Hospital, as deemed necessary by the Hospital staff, but limited to thirty days; medical and surgical care under the supervision of a senior physician or surgeon; drugs, X-ray work, and ward nursing. Special nursing is not covered. Students pay for board while in the hospital. Refraction of eyes, treatment of teeth and of all chronic and pre-existing conditions, such as diseased tonsils, hernias, pilonidal cysts and other elective surgery, chronic skin conditions, endocrine disturbances, etc. are not included. The cost of any necessary braces and orthopaedic appliances, as well as of special nursing, must be borne by the students, and blood used for transfusions must be paid for or replaced.

If students have insurance providing hospitalization, surgical, or medical benefits, the benefits shall be applied to the cost of their medical care. Accidents or illnesses occurring during vacations or while off the campus, are not included in this service. A special commercial policy available only to regularly enrolled Duke Students furnishes complementary protection, if desired.

Advisory consultation with a psychiatrist at no expense is available to students through referral either by the Student

Health Physicians or by the Deans, but office visits for psychotherapeutic interviews cannot be included in this service.

A woman physician is in charge and a nurse in constant attendance at the Woman's College Infirmary. Women students receive ambulant care at regular office hours and patients in this Infirmary can be transferred to the Duke Hospital at any hour of the day or night. Male students receive ambulant care at the Student Health Office in the hospital during regular office hours. The emergency service and the specialist consulting services of the Hospital and Medical School are always available.

Students are given a careful physical examination upon arrival at the University. Every applicant should be re-vaccinated against smallpox within three years before admission to the University. It is urgently advised that the standard Salk vaccine routine for poliomyelitis be completed by all students and that all male undergraduates be actively immunized to tetanus by injections of toxoid.

Simple directions for procedure in reporting the student's need for medical care are contained in the Student Handbook supplied to each student upon entering.



Students have an opportunity to hear lectures by distinguished scientists on the Duke faculty.



Above—After class, students gather to question their instructor concerning points in his lecture.



Left—In laboratories students test the theories of scientific knowledge and develop research skills.



Above—Varsity athletics give color and excitement to student life.

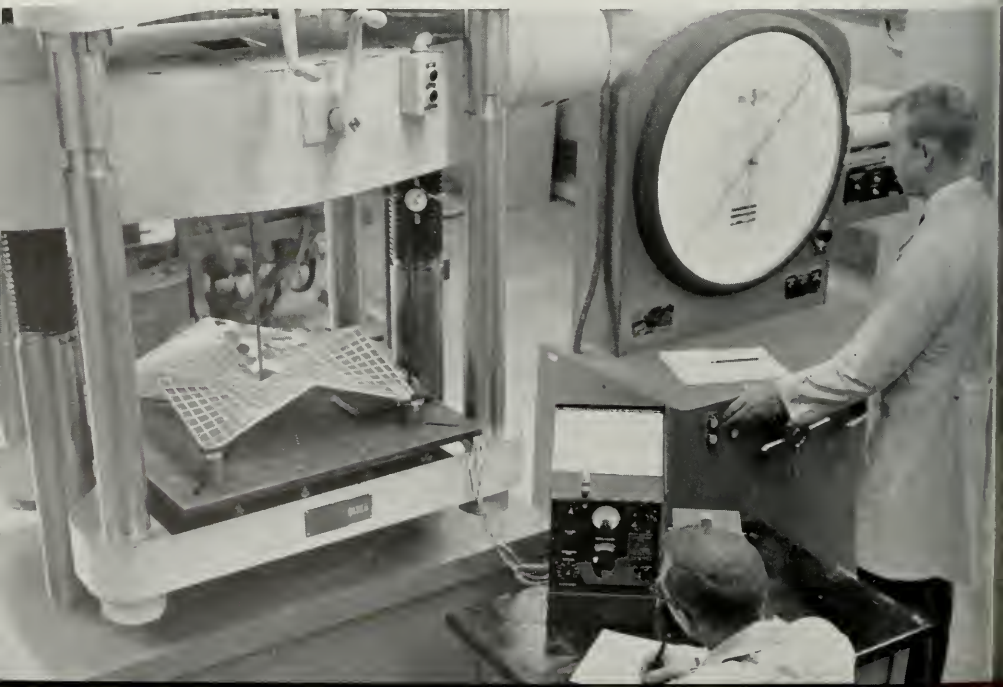
Below—The University offers extensive opportunities for recreation and athletic participation.





Above—A quiet and stimulating atmosphere is found in the reading and reference rooms of the libraries.

Below—Engineering students put scientific principles to work in specialized laboratories.



General Information

Class Attendance. Regular and punctual attendance in class work is expected of all students. Requirements for continuation in college and for graduation emphasize the desirability of the student assuming responsibility for class attendance.

Course Loads. The normal program for the student in Trinity College and the Woman's College is four or five academic courses, totaling 14 to 17 hours, per semester. In the College of Engineering the normal program is 17 to 19 hours per semester.

Grading System and Quality Credit. Grades in courses are recorded as A, B, C, D, F. Quality points are assigned to each grade: four quality points for A, three for B, two for C, one for D, for each semester hour. Thus an A grade in a three-semester hour course would earn twelve quality points.

Conduct. Students are expected to cooperate in maintaining high standards of conduct. The University reserves the right, and matriculation by the student is a concession of this right, to ask the withdrawal of any student whose conduct is not satisfactory to the University. Although direct supervision is entrusted to the Dean of Women and the Dean of Men, the respective men's and women's government associations exercise authority to investigate cases of misconduct and to make recommendations of penalties based on their findings.

Automobiles. Freshmen are not permitted to own or operate motor vehicles at the University. Upperclassmen are allowed to operate cars, provided they are registered and operated in accordance with University regulations. Under these conditions women in the senior class may also operate cars. A registration fee of \$15.00 per semester is charged for each student-operated car.

Bus Service. Free bus transportation is provided by the University between and through the campuses.

Courses

The following list of courses open to students in the undergraduate colleges is provided to suggest the range of courses available.

Courses numbered 1-49 are normally for Freshmen; those from 50-99, for sophomores; those from 99-199, for juniors and seniors; and those from 200-299, for seniors and graduate students.

Double numbers separated by a hyphen indicate that the course is a year-course and must normally be continued throughout the year if credit is received. A student must secure written permission from the instructor in order to receive credit for either semester of a year-course. Double numbers separated by a comma indicate that although the course is a year-course credit may be received for either semester without special permission.

Aerospace Studies:

- 1 Leadership Laboratory
- 2 Defense of the U. S.
- 51 World Military Systems
- 52 Leadership Laboratory
- 101,102 Growth and Development of Aerospace Power
- 203 The Problem of Flight and Applied Air Sciences of Weather and Navigation
- 205,206 The Professional officer
- Economics 152—Global Geography
- Political Science 121—Elements of International Relations

Art:

Aesthetics

- 121 The Principles of Art Criticism
- 221-222 History of Aesthetics

History of Art

- 1-2 Introduction to Art History
- 51-52 Introduction to Art History
- 131 Art and Archaeology of the Hellenic World
- 132 Roman Art and Archaeology
- 133 Mediaeval Architecture
- 134 Mediaeval Painting and Sculpture
- 136 Northern Renaissance Art
- 137 Italian Renaissance Painting and Sculpture
- 140 Seventeenth Century Painting and Sculpture in Europe
- 141 American Art
- 143 The History of Prints and Drawings

- 144 Renaissance and Baroque Architecture
- 145-146 The Rise of Contemporary Architecture
- 147 Painting and Sculpture in the Eighteenth and Nineteenth Centuries
- 148 Modern Painting and Sculpture
- 149 Pre-Columbian Art and Archaeology
- 150 Latin-American Art
- 191,192 Independent Study
- 217 Aegean Art
- 218 Early Greek Art
- 233 Early Mediaeval Architecture
- 234 Romanesque Sculpture
- 239 Architecture of Britain
- 240 Architecture of North America
- 292 Research Problems (in the North Carolina Museum of Art)

Design

- 1L-2L Design Laboratory
- 51L-52L Design Laboratory
- 53-54 Beginning Studio
- 55,56 Painting
- 157,158 Advanced Painting
- 159,160 Printmaking

Botany:

- 1, 2 General Botany
- 52 Plant Identification
- 55 Plant Anatomy
- 101 Principles of Heredity
- 103 General Bacteriology
- 105 Plant Morphology

- 151 Introductory Plant Physiology
- 156 Plant Ecology
- 191,192 Independent Study
- 202 Genetics
- 203 Plant Cytology
- 209 Lichenology
- 210 Bryology
- 212 Phycology
- 218 Comparative Morphology of Vascular Plants
- 221 Introductory Mycology
- 225-226 Special Problems
- 240 Plant Evolution
- 252 Plant Metabolism
- 254 Plant Water Relations
- 255 Plant Systematics
- 256 Community Analysis and Classification
- 257 Principles of Plant Distribution
- 258 Physiology of Growth and Development
- 259 The Environment

Forest Botany:

- 253 Dendrology

Chemistry:

- 1, 2 General Inorganic Chemistry
- 41 Advanced General Chemistry
- 42 Introduction to Chemical Analysis
- 61 Fundamentals of Analytical Chemistry
- 70 Quantitative Analysis
- 132 Quantitative and Instrumental Analysis
- 151,152 Organic Chemistry
- 161,162 Physical Chemistry
- 191,192 Independent Study
- 206 Elements of Theoretical Chemistry
- 215 Advanced Inorganic Chemistry
- 216 Nuclear Chemistry
- 234 Chemical Instrumentation
- 251 Qualitative Organic Analysis
- 252 Advanced Organic Preparations
- 253 Intermediate Organic Chemistry
- 265 Inorganic Chemistry
- 271 Introduction to Research
- 275-276 Research

Classical Studies:

Greek

- 1-2 Course for Beginners

- 15 Mythology
- 63-64 Intermediate Greek
- 105-106 Homer, Plato
- 107-108 Euripides, Sophocles, and Aristophanes
- 117-118 Greek Prose Composition
- 121,122 Greek Literature in English Translation
- 131 History of Greece
- 141,142 Greek Art
- 151 Greek Archaeology
- 191,192 Independent Study

Latin

- 1-2 Course for Beginners
- 63 Cicero's Orations
- 91 Latin Prose
- 92 Latin Poetry
- 97 Sight Reading in Classical Latin
- 98 Sight Reading in Medieval Latin
- 101 Tacitus
- 102 Juvenal
- 103 Cicero
- 104 Lucretius
- 105-106 Latin Prose Composition
- 111,112 Roman Literature in English Translation
- 131,132 History of Rome
- 191,192 Independent Study
- 205,206 Medieval Latin
- 211-212 Roman Oratory

Comparative Literature:

- 191,192 Independent Study
- 201,202 Romanticism
- 203,204 Realism and Symbolism
- 205 Foundations of Twentieth-Century European Literature

For a description of the following courses see the departmental listing. Readings in European Literature (English 153, 154)
Modern European Drama (English 155)
Religious Values in Classical and European Literature (Religion 187)

Drama: (See English)

Economics and Business Administration:

Economics

- 1 Introduction to Economic Problems

2	Evolution of Economic Ideas
51-52	Principles of Economics
103	Transportation
132	The Economic History of the United States
149	The Theory of the Firm
150	Economic Thought Since Adam Smith
152	Global Geography
153	Money and Banking
154	Aggregative Economics
155	Labor Problems
160	Political Economy of Europe
161	European Economic Problems
169	Economics of Consumption
189	Business and Government
201	Senior Seminar in Economics
204	Advanced Money and Banking
218	Business Cycles
219	Economic Problems of Under-Developed Areas
231	Economic History of Europe
233	State and Local Finance
237-238	Statistical Methods
243	Mathematical Economics
244	Introduction to Econometrics
257	Dynamics of the Labor Movement
262	Trade Unionism and Collective Bargaining
265	International Trade and Finance
268	Competition and Monopoly
286	Latin American Economics
287	Public Finance
293	Economic Systems
294	Economic Functions of the State

Accounting

57	Principles of Accounting I
58	Principles of Accounting II
147	Accounting for Control
171	Accounting Theory
172	Corporate Accounts
178	Accounting Systems
180	Governmental Accounting
273,274	Auditing, Theory and Practice
275-276	Advanced Industrial Accounting and Management
277	Income Tax Accounting
278	Advanced Problems in Income Taxation
279	Budgeting and Control
295,296	Advanced Accounting Seminar-Theory and Practice

Business Administration

109	The Economic Geography of Latin America
114	Economic Geography of Africa
115	Fundamentals of Geography
120	Economic Geography of the Pacific
138	Business Statistics
143	Corporation Finance
144	Investments
181,182	Business Law
184	Commercial Law for Accountants
185	Business Administrative Organization
188	Personnel Management
190	Quantitative Methods in Business
291	Business Policy

Education:

5	Developmental Reading
68	Mental Hygiene
100	Social Foundations of American Education
101-102	Elementary Education: Principles and Practice
113	History of American Education
114	History of Education in European Culture
118	Educational Psychology
123	Language Arts in the Elementary School
142	Children's Literature
151	Public School Music Education
152	Public School Music Literature
153	Vocal Education in the Public School
161	Integrated Art in the Public School
162	Plastic Art in the Public School
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203	Principles of School Administration
204	The School as an Institution
210	Introduction to Educational Research
215	Secondary Education: Principles
216	Secondary Education: Internship

- 217 The Psychological Principles of Education
- 225 The Teaching of History and the Social Studies
- 226 Teaching Reading in the Elementary School
- 228 Improvement of Instruction in the Social Studies
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- 234 Secondary-School Organization and Administration
- 235 The Nature, Function, and Reorganization of the Curriculum
- 236 Teaching Reading in the Secondary School
- 237 Literature for Adolescents
- 239 Methods of Problems of Teaching English in Secondary Schools
- 240 Educational and Occupational Information
- 241 Principles of Guidance
- 243 Personality Dynamics
- 246 The Teaching of Mathematics
- 253 School Law
- 258 Educational Measurements
- 266 Science in the Elementary School
- 276 The Teaching of High-School Science
- 290 Administration of School Property

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- 53 Advanced Grammar and Writing
- 65-66 Imaginative Writing
- 93 Technical Communication
- 100 English for Foreign Students
- 101 Advanced Expository Writing
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- 51 Essentials of Public Speaking
- 118 Persuasive Speaking
- 119 History of the Theater
- 121 Stagecraft
- 122 Play Production
- 139 The Speaking Voice
- 150 Oral Interpretation of Literature
- 151 Essentials of Public Speaking

- 152 Argumentation
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- 55, 56 Representative British Writers
- 57, 58 Representative American Writers
- 111,112 Eighteenth-Century Literature
- 117 Milton
- 123,124 Shakespeare
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- 127 The English Novel from the Beginnings to 1800
- 128 The English Novel in the Nineteenth Century
- 129 The English Novel in the Twentieth Century
- 131,132 English Literature, 1832-1900
- 133,134 Twentieth-Century Poetry
- 137,138 American Literature
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- 142 English Literature of the Middle Ages
- 143,144 English Literature: Elizabethan and Seventeenth Century
- 147 The Literary Expression of Scientific Thought
- 148 Satire
- 150 Oral Interpretation of Literature
- 153,154 Readings in European Literature
- 155 Modern European Drama
- 156 Modern English and American Drama
- 159 Readings in Scandinavian Literature
- 161 Development of the English Language
- 162 Modern English Grammar
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- 182 Conference on Poetry
- 183 Conference on Fiction
- 184 Conference on Prose Non-fiction or a Special Topic
- 191,192 Independent Study
- 197-198 Senior Seminar in English
- 203 Chaucer
- 207,208 History of the English Language
- 209 Present-Day English
- 213 Introduction to Folklore

- 215,216 Elizabethan Drama
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 219,220 The Eighteenth Century
 221,222 English Literature of the
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 223,224 English Literature of the
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 227 Literary Criticism
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 233,234 American Literature, 1865-
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 235,236 American Literature
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 237 English Drama, 1642-1800
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 106 Igneous and Metamorphic
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 151 Economic Geology
 152 Introductory Paleontology
 164 Introduction to Geologic
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 166 Structure
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 191,192 Independent Study
 203 Advanced Stratigraphy
 206 Geological Oceanography
 207 Sedimentary Petrography
 222 Sedimentary Materials
 234 Marine Geology

German:

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- 63-64 Intermediate German
 91,92 Introduction to German
 Literature
 107,108 Scientific German
 109-110 German Prose Fiction
 115,116 German Drama of the
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 117,118 German Conversation
 119,120 Survey of German Literature
 125,126 Contemporary German
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 191,192 Independent Study
 201,202 Goethe
 203,204 Eighteenth Century
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 207,208 German Romanticism
 209,210 Kleist, Grillparzer, and
 Hebbel
 211,212 Heinrich Heine and His Time
 213 Nineteenth-Century Literature
 214 The Twentieth Century
 215 Seventeenth-Century Litera-
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 216 History of the German
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 51 Apparatus-Tumbling
 52 Badminton
 53 Basketball-Handball
 56 Advanced Swimming
 57 Tennis-Volleyball
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- 51-52 Activity Courses for Sophomores
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- 101 History and Principles of Physical Education
- 102 The Teaching of Physical Education in Elementary Schools
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- 105-106 Methods and Materials in Recreation
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- 114 Kinesiology
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- 120 Evaluation and Measurement in Physical Education
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- 51,52 Modern History
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- 92 The Development of American Democracy, 1865 to the Present
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- 107-108 Social and Cultural History of England
- 109-110 History of Rome
- 111,112 America in the Colonial and Early Modern Era
- 113,114 America in the Twentieth Century
- 121,122 Foreign Relations of the United States, 1775 to the Present
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- 131,132 The Development of the Major South American Powers
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- 139,140 Nineteenth-Century Europe
- 141,142 China and Japan in Modern Times
- 147 The History of India to 1757
- 148 The History of India, 1757 to the Present
- 153,154 The History of the South
- 157,158 The Rise of Modern Science
- 161,162 Russia from Ivan the Terrible to Present Times
- 163,164 Reform and Politics in Nineteenth Century America
- 191,192 Independent Study, juniors
- 193,194 Independent Study, seniors
- 201-202 History of Russia
- 203-204 The United States, 1850-1900
- 205-206 The United States in the Twentieth Century
- 208 Economic History of India
- 212 Recent Interpretations of United States History
- 213-214 The Old South
- 215-216 The Diplomatic History of the United States
- 221-222 The Age of the Renaissance
- 223-224 The Old Regime and the

- French Revolution, 1661-1815
- 225-226 The Age of the Reformation
- 227-228 Europe in the Nineteenth Century
- 229 Recent Interpretations of Modern European History
- 231-232 The Hispanic Colonies and Republics in America
- 233-234 The Institutional, Cultural, and Social History of Hispanic America
- 235,236 European Expansion Overseas (1415-1898)
- 237-238 Europe in the Middle Ages, 395-1500
- 241-242 Nationalism and Communism in the Far East
- 245-246 War in the Modern World
- 247 The History of Modern India, 1757-1857
- 248 The History of Modern India and Pakistan, 1857-1947
- 249-250 Social and Intellectual History of the United States
- 251-252 Recent European History
- 259-260 The Emergence of the New South, 1865 to the Present
- 261-262 Russia in the Twentieth Century
- 263-264 American Colonial History and the Revolution, 1607-1789
- 267-268 England from Edward III to Anne
- 269 British History from 1714 to 1867
- 270 Great Britain and the Commonwealth of Nations, 1867 to the Present
- 285 Origins of Indian Civilization
- 297 The British Empire in the Nineteenth Century (from 1783)
- 298 The Commonwealth in the Twentieth Century

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- 195A-196A The Background of Modern European Civilization
- 195B-196B Twentieth-Century Europe
- 195C-196C Problems in American Intellectual History
- 195D-196D The Progressive Era Through the New Deal

- 195E-196E American History before 1789
- 195F-196F Problems in Nineteenth Century American Reform and Politics
- 195G-196G Nationalism and Communism in the Far East
- 195H-196H From Rural to Urban Society in the United States
- 195I-196I Nationalism and Freedom in Nineteenth Century Europe
- 197-198 Senior Honors Seminar

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For a brief description of this program see page 37 of the **Bulletin of Undergraduate Instruction**

Colloquium 101,102. The University and the Scholar

Linguistics:

- 101 Introduction to Linguistics
- For a description of the following courses consult the listings under the specified departments.
- History of the English Language (English 207, 208)
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- Old French Language and Literature (French 219)
- Middle High German (German 205, 206)
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- Romance Linguistics (Romance Languages 224)
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- Old Spanish Language (Spanish 257)

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- 17 Introduction to Finite Mathematics
- 18 Elementary Statistics
- 21,22 Introductory Calculus
- 41,42 Introductory Calculus
- 63,64 Intermediate Calculus
- 83,84 Intermediate Calculus
- 111 Applied Mathematical Analysis I
- 112 Applied Mathematical Analysis II

- 113,114 Modern Algebra
 131 Elementary Differential Equations
 135,136 Probability and Statistics
 139,140 Advanced Calculus
 141,142 Junior Mathematics Seminar
 183,184 Senior Mathematics Seminar
 204 Geometry for Teachers
 217-218 Analysis
 221 Digital Computer
 222 Introduction to Numerical Analysis
 227,228 Theory of Numbers
 229,230 Algebraic Numbers
 233 Statistical Methods
 234 Sample Designs
 235,236 Abstract Algebra
 244 Design of Experiments
 247,248 Arithmetic of Polynomials
 253,254 Differential Geometry
 271,272 Introductory Topology
 283 Probability for Engineers
 285,286 Applied Mathematical Methods, I, II
 287,288 Foundations of Mathematics
 290 Applications of Stochastic Processes
 291,292 Theory of Functions

Medical Science:

- M201 Anatomy as Related to Locomotion

Music:

- 65-66 Music Theory I
 115-116 Music Theory II
 117,118 Music Theory III
 121 Conducting
 122 Orchestration

History and Literature

- 1-2 Introduction to Music
 51-52 Introduction to Music
 125 Masterworks of Music Literature
 133 Orchestral Literature
 134 Choral Literature
 135 Piano Literature
 136 Solo Song Literature
 137 Chamber Music
 138 Contemporary Music
 139 The Evolution of Style in Twentieth Century Music
 141 Beethoven: An Analysis of Classical System
 147-148 History of Music

- 149 Organ Literature
 163 Music in the Eighteenth Century
 164 Music in the Nineteenth Century
 165 Opera Literature
 195,196 Collegium Musicum

Musical Education

- 57-58 Vocal Diction
 106 Piano Methods and Materials
 151 Public School Music Education
 152 Public School Music Literature

Applied Music—Instrumental and Voice

Naval Science:

- NS 101 Naval Orientation
 NS 102 Naval History
 91 Introductory Psychology
 NS 202 Naval Weapons
 NS 301 Naval Operations
 NS 301M Evaluation of the Art of War
 NS 302 Navigation
 NS 302M Modern Basic Strategy and Tactics
 NS 401 Naval Engineering
 NS 402 Principles and Problems of Leadership

Philosophy:

- 41,42 Knowledge, Fact, and Value
 48 Logic
 93,94 History of Philosophy: Ancient and Modern
 97 Political and Social Philosophy
 98 Social Ideals and Utopias
 101 Philosophy of Religion
 103 Symbolic Logic
 104 Philosophy of Science
 107 Political and Social Philosophy
 108 Social Ideals and Utopias
 109 Philosophy of Language
 110 Epistemology
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 117 History of Ethics
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 203 Contemporary Ethical Theories
 205 The Philosophy of History
 208 Political Values

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217	Aristotle	183	Comparative Government and Politics: Southeast Asia
241	Logic	223	Political Thought to the Seventeenth Century
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252	Metaphysics	229	Recent and Contemporary Political Theory
291,292	Critical Philosophy	231	American Political Theory
Physics:		235	The British Commonwealth
1-2	Introductory Physics	250	Comparative Government and Politics: Southern Asia I
41-42	General Physics	251	Comparative Government and Politics: Southern Asia II
125	Intermediate Physics—Mechanics	252	Comparative Government and Politics: Japan
126	Intermediate Physics—Electricity	280	Comparative Government and Politics: Sub-Saharan Africa
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171	Electronics	109	State and Local Government Today
176	Intermediate Physics—Thermodynamics and Kinetic Theory	125	American Political Parties and Practical Politics
201,202	Mechanics	128	Judicial Process
213,214	Contemporary Physics	129	Groups in American Politics
217,218	Advanced Physics Laboratory	137	Political Behavior in Elections
220	Advanced Electronics	138	Political Behavior in Policy Making
221,222	Theoretical Physics	141	Public Administration
223,224	Electricity and Magnetism	142	Administrative Responsibility
225,226	Elementary Investigations	146	Legislation
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61-62	American and European Political Systems	190	Public Personnel Administration
Political Theory and Comparative Government		207	American Constitutional Law and Theory
123	Introduction to Political Philosophy	208	American Constitutional Law and Current National Problems
127	Introduction to Law	209	Problems in State and Local Government in the United States
131	Introduction to American Political Thought	230	American Political Institutions
136	Major European Governments	234	Civil-Military Relationships in American Government
143	Comparative Government and Politics: The Middle East		
151	Comparative Government and Politics: Latin America		
155	Problems of Political Development in the New States		
160	Government of the USSR		
180	Comparative Government and Politics: Southern Asia I		
181	Comparative Government and Politics: Southern Asia II		

241	Administrative Management	141	Personality and Behavior Disorder
242	National Administration	142	Instrumental Behavior
244	Administrative Law and Process	144	The Psychology of Learning
246	Government Administration and Public Policy	145	Experimental Approaches to Personality
275	The National Party System	147	Experimental Social Psychology
276	Comparative State Parties and Politics	148	Psychology of Perception and Thinking
291	Problems of Municipal Government	151	Psychology and International Relations
292	Municipal Administration	152	Physiological Psychology
		153	Introduction to Biological Psychology
	International Law and Relations	171,172	Junior Tutorial
121	Elements of International Relations	173,174	Senior Tutorial
122	Modern International Politics	175,176	Independent Research
124	The New States of Africa in World Affairs	191,192	Independent Study and Research I
158	Control of American Foreign Policy	193,194	Independent Study and Research II
221	International Public Organization	203	Psychology of Perception
227-228	International Law	204	Comparative Psychology
		207,208	Independent Study and Research
	Independent Reading and Undergraduate Seminar	210	Cognition and Higher Mental Processes
191,192	Independent Study	213,214	Conditioning and Learning
193,194	Independent Study	215	Developmental Psychology
197,198	Senior Seminar in Political Science	216	Biological Psychology
		217	Research Methods in Social Psychology
	Psychology:	218	Social Psychology
91	Introductory Psychology	220	Physiological Bases of Behavior
100	Personality and Social Behavior	225	Personality and Experimental Dynamics
101	Introductory Social Psychology	229,230	Introduction to Research
104	Comparative Psychology	233	Personality and Cognitive Processes
108	Introduction to Biological Psychology	236	Theoretical Psychology
110	Applied Psychology	237	Functional Neurophysiology
111	Advanced General Psychology	238	The Electroencephalogram and Psychological Function
116	Psychology of Adjustment	239	Behavioral Correlates of Brain Damage in Man
117	Statistical Methods in Psychology	245-246	Personality Theory and Assessment
118	Experimental Methods in Psychology	265	Fundamental Statistical Applications in Psychological Research
121	Child Psychology	266	Advanced Statistical Applications in Psychological Research
122	Adjustment of the Pre-School Child	292	History of Psychology
126	Adolescent Psychology		
130	Principles and Methods of Psychological Evaluation		
132	The Psychology of Individual Differences		

Religion:

- 1-2 The English Bible
- 51-52 The English Bible
- 55 The Religion of the Bible
- 65 Jesus: The Man and His Message
- 85 Introduction to Christian Ethics
- 93 Survey of the World's Living Religions
- 100 Principles of Investigation
- 111 The Prophets of the Old Testament
- 121 The Mission and Message of Jesus
- 123 The Life and Letters of Paul
- 124 The Early Church from Paul to Irenaeus
- 131 History of Christianity from The Early Church through the Reformation
- 133 History of Christianity Since the Reformation
- 135 Christian Biography
- 137 Protestantism in America
- 138 Contemporary Religions in the United States
- 140 Christian Beliefs
- 144 Problems of Religious Thought
- 149 Current Interpretations of Christianity
- 152 Christian Ethics
- 156 Christian Marriage and the Family
- 160 Christian Education
- 171 Religions of the Ancient Near East
- 172 Religious Quests of the Greco-Roman World
- 175 Non-Christian Religions of the Modern World
- 179 Mysticism: Sacred and Profane
- 187 Religious Values in Classical and European Literature
- 191,192 Independent Study, juniors
- 193,194 Independent Study, seniors
- 195-196 Honors Research

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- 203 Biblical Studies
- 204 Church History
- 205 Theology and Ethics
- 206 Christianity and Culture
- 207 History of Religions

- 228 The Theology of the Gospel and the Epistles of John
- 248 The Theology of Karl Barth
- 260 Wesley Studies
- 270 The Religion of the Hindus
- 272 Origins of Indian Civilization

Romance Languages:**French**

- 1-2 Elementary French
- 63-64 Intermediate French
- 91-92 Introduction to French Literature
- 97 Spoken French
- 104 The Sixteenth Century
- 106 The Worlds of Rousseau
- 107 The Worlds of Voltaire
- 108 French Romanticism
- 109 Toward Modernism in French Poetry
- 111 French Drama of the Nineteenth Century
- 112 French Drama of the Twentieth Century
- 113 The Classical Ideal
- 127,128 Advanced Composition and Conversation
- 134 Contemporary French Life and Thought
- 191,192 Independent Study, juniors
- 193,194 Independent Study, seniors
- 209 Advanced Composition and Syntax
- 210 French Phonetics
- 213,214 French Classicism
- 219 Old French Literature
- 221,222 The Nineteenth Century French Novel
- 227 French Poetry Since Théophile Gautier
- 238 Anatole France
- 241,242 French Literature and Thought in the Age of Enlightenment
- 245 French Literature of the Twentieth Century, 1895-1925
- 246 French Literature of the Twentieth Century 1925-1955

Italian

- 181-182 Italian
- 283 Dante: La Divina Commedia
- 288 The Renaissance

Portuguese

181-182 Portuguese

Spanish

- 1-2 Elementary Spanish
 63-64 Intermediate Spanish
 91-92 Introduction to Spanish Literature
 97 Spoken Spanish
 156 Representative Writers of Spanish American Literature
 161 Spanish Literature of the Renaissance and the Baroque
 162 Spanish Romanticism
 164 Spanish Civilization
 165 Analysis of Great Spanish Authors
 176 Advanced Conversation
 191,192 Independent Study, juniors
 193,194 Independent Study, seniors
 251 The Origins of the Spanish Novel
 252 Spanish Lyric Poetry Before 1700
 253 The Origins of the Spanish Theater
 255 Modern Latin American Literature
 256 Contemporary Latin American Literature
 258 Old Spanish Literature
 259 Spanish Phonetics
 260 Advanced Composition and Syntax
 261 Nineteenth Century Novel
 264 Modern and Contemporary Spanish Theatre
 265 Golden Age Literature: Cervantes
 266 Golden Age Literature: The Drama
 275 Contemporary Spanish Literature: Essay and Lyric Poetry
 276 Contemporary Spanish Literature: Novel

Romance Languages:

- RL211 Approaches to Romance Literature
 RL218 The Teaching of Romance Languages
 RL224 Romance Linguistics

Russian:

- 1-2 Elementary Russian
 63-64 Intermediate Russian
 91-92 Advanced Russian
 97,98 Spoken Russian
 101,102 Russian Literature and Culture through the Nineteenth Century
 103 Soviet Literature and Culture
 105 The Russian Theatre and Drama
 112 Pushkin and the Birth of Russian Realism
 191,192 Independent Study
 201,202 The Novelists of Nineteenth Century Russia

Sociology and Anthropology:

- 91,92 Introduction to Sociology
 93 General Anthropology
 94 Cultural Anthropology
 130 Cultural Change and Stability
 131 Peoples of the World: American Indian
 132 Peoples of the World: Africa and Oceania
 133 Peoples of the World: Asia
 137 Comparative Social Structures
 141 Introduction to Population and Human Ecology
 142 The Sociology of Mass Communication
 145 Urban Sociology
 146 Industry and Society
 150 The Family
 153 Sociology of the South
 154 The Sociology of the Arts
 155 Introduction to Industrial Sociology
 159 The Negro in America
 172 Collective Behavior and Social Movements
 199 Independent Study
 230 Society and Culture in India
 232 Primitive Religion
 234 Personality and Society
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 238 Language and Society
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245	Deviant Social Behavior
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272	Socialization Process
275	Social Attitudes and Individual Behavior
278	Social Structure and the Life Cycle
281	Development of Sociological Theory
295	Methodology in Sociology
296,297	Statistical Analysis in Sociology

Zoology:

1	Animal Biology
2	General Zoology
53	Comparative Vertebrate Anatomy
71	Heredity and Eugenics
92	General Embryology
103	Principles of Ecology
109	Evolution
110	Introduction to Genetics
120	Ornithology
151	Principles of Physiology
156	Vertebrate Histology
161	Animal Parasites
196	Seminar: Current Develop- ments in Zoology
197,198	Special Problems
201	Animal Behavior
203	Ecology
210	Experimental Genetics
216	Limnology
222	Entomology
224	Vertebrate Zoology
228	Experimental Embryology
238	Systematic Zoology
243	Cytology
245	Radiation Biology
246	Molecular Biology
247	Biological Nucleonics
252	Comparative Physiology
253	Advanced Vertebrate Morphology
271	Cellular Physiology
274	Invertebrate Zoology
276	Protozoology
278	Invertebrate Embryology

COLLEGE OF ENGINEERING

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61	Plane Surveying
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72	Materials Laboratory I
101	Materials Laboratory II
5110	Plane Surveying
113	Route Surveying
116	Transportation Engineering
118	Materials of Engineering
121	Hydrology
123	Hydraulic Engineering
124	Fundamentals of Sanitary Engineering
126	Sanitary Engineering Design
131	Structural Mechanics I
132	Structural Design
133	Reinforced Concrete
135	Soil Mechanics
137,138	Seminar
140	Structural Mechanics II
143,144	Project in Civil Engineering
146	Professional Engineering
148	Structural Engineering
154	Geometric Thoroughfare Design
201	Theoretical and Applied Mechanics
202	Advanced Mechanics of Materials and Experimental Stress Analysis
203	Advanced Mechanics of Ma- terials
204	Theory of Plates and Shells
205	Theory of Elasticity
211	Behavior of Materials
231	Structural Theory and Analysis
232	Reinforced Concrete Theory
235	Foundation Engineering
242	Hydraulic Engineering
244	Sanitary Engineering Processes
250	Engineering Analysis

Electrical Engineering

53	Electrical Engineering Fundamentals
55	Electric Networks I
56	Electric Networks II
109-110	Electromagnetic Systems
111-112	Electrical Principles Laboratory
123	Fundamentals of Electrical Engineering
124	Industrial Electrical Engineering
125	Electrical Fundamentals Laboratory
126	Industrial Electrical Laboratory

127	Electronics for Engineers	128	Dynamics of Gases
159	Transmission	141,142	Machine Design
161	High Voltage Phenomena	153	Heating, Air Conditioning and Refrigeration
165-166	Electrical Engineering Seminar	156	Combustion Engines
171	Fundamentals of Illumination	157	Pumps, Compressors and Turbines
173-174	Projects in Electrical Engineering	159-160	Senior Mechanical Engineering Laboratory
177	Energy Transmission and Radiation	162	Power Plants
179	Advanced Electrical Measurements	163	Vibration Control
181-182	Electronic Networks	164	Engineering Analysis
183-184	Electronics Laboratory	166	Air Conditioning Design
189	Electromagnetic Devices	167	Industrial Engineering
191-192	Electric Machinery	168	Industrial Engineering Production Methods
193-194	Electric Machinery Labora- tory	171	Response of Physical Systems
199	Linear Feedback Systems	173-174	Mechanical Engineering Seminar
201	Energy Systems	182	Fundamentals of Nuclear Engineering
203,204	Information Systems	197-198	Projects in Mechanical Engineering
205	Analog Computation	201	Theoretical and Applied Mechanics
207	Network Synthesis	202	Theoretical Thermodynamics
211,212	Solid State Theory	221	Analysis of Incompressible and compressible Fluid Flow
213	Magnetics	222	Analysis of Heat Transfer
221,222	Nonlinear Electromagnetics	231-232	Systems Engineering
231	Nuclear Engineering	280	Nuclear Reactor Power Cycles
241	Feedback Control Systems		
242	Optimum Control Systems		
243	Nonlinear Control Systems		
259	Advanced Electric Energy Conversion		
265	Advanced Topics in Electrical Engineering		

Mechanical Engineering:

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59	Materials and Processes
101-102	Engineering Thermodynamics
103	Thermodynamics
105	Dynamics of Liquids
106	Heat Transfer.
113-114	Junior Mechanical Engineer- ing Laboratory
116	Mechanical Engineering Laboratory

Engineering Subjects Common to All Curricula

1	Engineering Graphics
2	Descriptive Geometry
57	Statics
60	Engineering Mechanics
107	Mechanics of Materials
109	Mechanics of Materials Laboratory
115	Dynamics
128	Fluid Mechanics
153	Architectural Engineering
169	Legal Aspects of Engineering
170	Patent Law for Engineers

Calendar of the Colleges

1967

- September 15..Friday, 7:30 p.m. Orientation begins: Assemblies for all new students entering Trinity College, the Woman's College, and the College of Engineering.
- September 18..Monday, Registration and matriculation of all students of Trinity College, the Woman's College, and the College of Engineering, who have not pre-registered.
- September 20..Wednesday, Final Registration of pre-registered students.
- September 21..Thursday, Fall semester classes begin.
- November 4..Saturday, Last day for reporting six-weeks grades.
- November 22..Wednesday, 12:30 p.m. Thanksgiving recess begins.
- November 27..Monday, 8:10 a.m. Classes are resumed.
- December 11..Monday, Founders' Day.
- December 20..Wednesday, 12:30 p.m. Christmas recess begins.

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- January 3....Wednesday, 8:10 a.m. Classes are resumed.
- January 13....Saturday, 12:30 p.m. Fall semester classes end.
- January 17....Wednesday, Final examinations begin.
- January 26....Friday, Final examinations end.
- January 30....Tuesday, Registration and matriculation of new students.
- January 31....Wednesday, Last day for matriculation for the Spring semester.
- February 1....Thursday, Spring semester classes begin.
- March 13....Wednesday, Last day for reporting six-weeks grades.
- March 23....Saturday, 12:30 p.m. Spring recess begins.
- April 1.....Monday, 8:10 a.m. Classes are resumed.
- May 16.....Thursday, 5:00 p.m. Spring semester classes end.
- May 20.....Monday, Final examinations begin.
- May 29.....Wednesday, Final examinations end.
- June 1.....Saturday, Commencement begins.
- June 2.....Sunday, Commencement Sermon.
- June 3.....Monday, Graduating Exercises.



Duke
University

ACADEMIC GUIDE FOR FRESHMEN

Bulletin of Duke University

Volume 38

Number 8-B

June, 1966

BULLETIN
OF
DUKE UNIVERSITY



ACADEMIC GUIDE FOR FRESHMEN
IN THE UNDERGRADUATE
COLLEGES

TRINITY COLLEGE
THE WOMAN'S COLLEGE
THE COLLEGE OF ENGINEERING
THE SCHOOL OF NURSING

DURHAM, NORTH CAROLINA
1966

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REGISTRATION MATERIALS	Inside back cover

NOTES: 1. *The registration materials inserted in the pocket inside the back cover of this booklet REQUIRE ATTENTION PRIOR TO JULY 1.* By that time they should have been completed and returned in the envelope provided to the freshman office of the appropriate school or college.

2. Because of the relevance of this brochure to academic planning during the freshman year, be sure to place it with the items you will bring to the campus in September.

Published by Duke University monthly except in July, August, September, and December. Entered as second-class matter March 25, 1929, at the Post Office of Durham, North Carolina, under the Act of August 24, 1912.

INTRODUCTION

This brochure is designed for freshman students of the undergraduate colleges of Duke University. In it you will find information regarding the freshman program of study, including a statement of the rationale, depth, and breadth of the courses open to freshmen; information about advanced placement and other special opportunities of which you may avail yourself; and a few words about the philosophy of curriculum of the undergraduate colleges and the scope and coverage of the various disciplines. In addition, you will find here a list of books recommended for your summer reading as you prepare to begin your college experience. Hopefully you will derive from this booklet a sense of the excitement inherent in the training of the searching mind.

A very practical purpose of this *Academic Guide* is to assist you in your preliminary registration for your first college semester and in your advance planning for your later work at Duke. In the pocket inside the back cover you will find cards to be used in registering for courses for the fall term; they must be completed and mailed according to the instructions on the first card. You should become thoroughly familiar with the contents of this booklet before attempting to fill out these cards. The *Bulletin of Undergraduate Instruction* or the *Bulletin of the School of Nursing* will also be of considerable help regarding courses and requirements, and you should familiarize yourself with the one which pertains to you. Both the *Academic Guide* and the *Bulletin* should be brought with you to Duke in September for further reference.

A fall course schedule will be made for each student on the basis of his preliminary registration and of course placements indicated by academic departments after reviewing scores on CEEB Advanced Placement Examinations and Achievement Tests. It should be understood that changes in the course program may be made during Freshman Week in response to in-residence counseling and the results of Duke placement tests.

On the threshold of college, many students will have formed certain preconceived notions of what they expect to meet in their academic work. In general they will expect that their courses will be more demanding of time and of thought than were their preparatory courses. They may also expect to find a different approach, a dif-

ferent philosophy of learning and of values, since the primary and continuing function of university education is to assure maximum training and development of the intellectual powers of the student. Basic to this concern is our faith in the power of a liberal education to provide a foundation for the cultivation of leadership in both the specialist and the generalist. To realize his hopes and to satisfy his needs, the Duke student will require acquaintanceship with his own heritage and tools with which to work. Having these, he may hopefully advance toward the discovery and development of his highest talents. This is the crux of the educational process, both for the individual as individual and as citizen. Duke believes that the greatest contribution to society can be expected from the highest development of the individual.

There is, of course, no royal road to learning, no one way but many through which excellence is achieved. Easy courses and easy standards are not among them. Students must be expected to assume initiative and responsibility—under the best guidance and direction possible in the University—for developing effective habits of reading and study, for organizing well a body of factual information and of drawing valid conclusions from such a body of knowledge, for dealing effectively with the intellectual content of a subject and its area; in short, for developing an intellectual and moral integrity characteristic of the best and most fruitful kind of leadership in a democracy.

In moving toward these high goals, the Duke student has available a program of study that provides a basic breadth of learning in several disciplines and a deepening concentration upon his chosen specialty. Available to him in each academic department is a supervisor of freshman instruction and/or a director of undergraduate studies who will advise him concerning major requirements and other details of his work, and the faculty stand ready to provide the intellectual stimulus possible between co-workers in the exciting adventure of learning.

Since this booklet is an academic guide, it is appropriate to accent the integral nature of education: it occurs not only in the classroom, library, and laboratory. The student will find his academic experience extended, conditioned, and reinforced by the residential experience in his undergraduate college. Newly-admitted students are expected to begin their college work at Duke with the program of Freshman Week when they may be introduced to the total college experience.

FRESHMAN ACADEMIC CALENDAR

<i>Bulletin of Undergraduate Instruction (or of School of Nursing), Academic Guide for Freshmen, and Preliminary Registration Materials</i> mailed to Freshmen	June 1-2
Preliminary Registration Materials returned by mail by Freshmen to appropriate College Office	Prior to July 1
<i>Freshman Week</i> booklets mailed to Freshmen	August 1-15
Freshman Week begins	September 16
Fall semester classes begin	September 22
Advisory grade reports due from instructors	November 5
Conferences on courses and pre-registration for the spring semester	November 14-17
Final Examination Period	January 17-27, 1967
Spring semester classes begin	February 2
Advisory grade reports due from instructors	March 15
Conferences on courses of study and pre-registration for coming fall term	April 10-13
Final Examination Period	May 20-31

PRELIMINARY REGISTRATION FOR THE FIRST SEMESTER

Before completing the enclosed Course Program card and Course Request cards (pocket at back of brochure), refer to the *Bulletin of Undergraduate Instruction* (or of the *School of Nursing*) for (1) a description of uniform requirements in each undergraduate college or school, (2) the work constituting a major in each discipline, and (3) preparation for specialized programs and professional schools. Representative course programs for each college or school are given below. A student who has not yet found a field of greatest interest should request one or more courses that may be helpful later in the choice of a major field.

One should also consider the possibility of his qualifying for a special section or course, or a tutorial, in an area of particular interest. Special sections or courses are offered in chemistry, English, history, mathematics, political science, religion, and sociology, while tutorials are available *to accompany* the introductory courses in history, philosophy, political science, and religion. Most special sections are designated by the letter X, special courses by the numbers 41, 42, tutorials by numbers 43, 44.

In general special sections presume background in the area, interest and very good ability. Tutorials, on the other hand, are open to all interested students (in so far as they can be accommodated) who have a genuine desire to learn but not necessarily any special competence or background. Since either possibility is demanding of time in preparation and calls for more rigorous work, it is generally not advisable to request more than one such section or tutorial.

Note: Be sure to complete course request cards for Fall courses only.

**Representative Program for Freshmen in
The Woman's College and Trinity College***

Fall Semester			Spring Semester		
COURSE	SEMESTER	HOURS	Course	Semester	Hours
English		3	English		3
Foreign Language		4(or 3)	Foreign Language		4(or 3)
Laboratory Science		4	Laboratory Science		4
One or two others (require- ments or electives)		3(or 6)	One or two others (require- ments or electives)		3(or 6)
Physical Education		<u>1</u>	Physical Education		<u>1</u>
Total (minimum and maximum)		15-18	Total (minimum and maximum)		15-18

*Note: For Woman's College and Trinity College freshmen, it is generally wise to include a foreign language and a laboratory science, and at least one other course that will satisfy a uniform requirement. Students whose special interest is in the humanities or social sciences may wish to postpone the laboratory science to the second year. Premedical students will generally take Math 21 (or higher course by Advanced Placement) and, in some cases, a second laboratory course.

**Uniform Program for Freshmen in the
College of Engineering**

Fall Semester			Spring Semester		
COURSE	SEMESTER	HOURS	Course	Semester	Hours
Chemistry 1		4	Chemistry 2		4
Engineering 1		2	Engineering 2		2
English 1		3	English 2		3
Approved Elective		3	Engineering 23		3
Mathematics 21		3	Mathematics 22		3
Physical Education 1		<u>1</u>	Physical Education 2		<u>1</u>
Total		*16	Total		*16

*Engineering students taking Air Science or Naval Science may need to schedule certain courses in addition to the program listed here.

**Representative Program for Freshmen in the
School of Nursing***

Fall Semester			Spring Semester		
COURSE	SEMESTER	HOURS	Course	Semester	Hours
English 1		3	English 2		3
History, Pol. Science or Economics		3	History, Pol. Science or Economics		3
Laboratory Science (Botany, Chemistry Physics or Zoology)		4	Laboratory Science (Botany, Chemistry Physics or Zoology)		4
Elective [Art, Music, Philosophy (not 48), Religion, Literature, or Literature in translation]		3	Elective [Art, Music Philosophy (not 48), Religion, Literature or Literature in translation]		3
Nursing 1		2	Nursing 2		2
Physical Education 1		<u>1</u>	Physical Education		<u>1</u>
Total		16	Microbiology		<u>3</u>
			Total		19

*Students entering the School of Nursing should consult the Bulletin of the School of Nursing instead of the Bulletin of Undergraduate Instruction.

ADVANCED PLACEMENT

The specific content of a student's freshman program is determined, in part, by the *level* of course placement he achieves. (This is readily seen in Chemistry 1 and Physics 41 where course enrollment is contingent upon a student's eligibility for Mathematics 17 or 21.) Accordingly, entering students may achieve advanced placement in many fields listed below through three routes:

(1) **CEEB *Advanced Placement Examinations*** (in botany, chemistry, French, German, history, Latin, mathematics, physics, Russian, Spanish, and zoology). Students who have taken one or more Advanced Placement Examinations will be notified by letter prior to the beginning of fall semester classes whether or not they have earned advanced placement.

(2) **CEEB *Achievement Tests*** (in foreign language and mathematics). Students will receive final notification of their course placement *early in Freshman Week*. Whether or not a student elects to take at Duke a subject in which he has received advanced placement is, naturally, his own decision.

(3) **DUKE *Freshman Week Placement Tests***. A student who has not taken CEEB Achievement Test in mathematics or one in a particular foreign language, and who desires to continue work in these specific areas at Duke, will have the opportunity to qualify for advanced placement on the basis of tests administered during Freshman Week.

Students entering Trinity College or The Woman's College will either continue work in a foreign language at the assigned placement level or will begin another language at the elementary level. Students assigned to a foreign language course numbered 91-92 who have confidence in their ability to understand the spoken language (does not apply to Greek or Latin) are urged to discuss with the appropriate Director of Undergraduate Studies the possibility of placement in a course at the 100-level.

The mathematics placement test establishes whether a student is qualified for Mathematics 17, 21, or 41. Freshmen who believe they are eligible for placement beyond Mathematics 41 on the basis

of having had one or more courses in introductory calculus in secondary school and who have not taken the CEEB Advanced Placement Test in mathematics are invited to see the Supervisor of Freshman Instruction in Mathematics early in Freshman Week.

Freshmen who anticipate taking the Duke Freshman Week placement tests in mathematics, a foreign language, or chemistry are urged to review for them.

(1) Those students who expect to enter economics, business administration or accounting, engineering, pre-medical or pre-dental, mathematics, or science fields are advised to review their secondary school mathematics, particularly algebra (e.g., factoring, fractions, linear equations in one, two, and three unknowns, functions and graphs, exponents and radicals, and elements of quadratic equations) in order to qualify for Mathematics 21 or Mathematics 17.

(2) In the area of foreign languages, a student who is reviewing for the Duke placement test in French, German, Russian, or Spanish should know that these tests are the CEEB type with two distinct parts:

1. A section on reading comprehension. A student may prepare for this by extensive rapid reading. He should strive for general comprehension rather than translation.
2. A test of basic grammar. A student may prepare for this section by a review of basic grammar with particular attention to regular and irregular verbs.

A potential science major or a pre-medical student should be advised that only French, German, and Russian ordinarily will meet his foreign language requirements.

(3) All students later given tentative placement in Chemistry 41 will be expected to take the chemistry test administered in Freshman Week. These students are advised to review the periodic table, properties of gases, chemical reactions, problems based on chemical equations (if mole method was used), and atomic and molecular structure.

Finally, inasmuch as a physical performance test (see Physical Education, page 47) is administered at the inception of the fall semester, the student is well-advised to condition himself for this activity prior to Freshman Week.

THE FRESHMAN YEAR . . . AND THE YEARS AHEAD

Placing this *Academic Guide* in your hands symbolizes the importance of your role in your education; only as you are actively involved as a student will your education become more than technical training. The specific content of the curriculum, as prescribed by the faculty, is intended basically as a set of guidelines for your full development as an individual. Though you may be primarily concerned with meeting college academic requirements just now, you should realize that the initiative in your education is yours: it is your responsibility to devise within the prescribed framework a balanced course program that provides exposure to new fields and ideas, yet is faithful to your recognized interests.

Beyond the thoughtful selection of courses, what opportunities should you seek for initiative and engagement? These begin with the program of summer reading described at the end of this brochure. During the academic year other opportunities involve formal education, i.e., course work and honors offerings, and what may be termed informal education. Each possibility has its merits and role; each may be fully or badly used; all figure in an undergraduate education.

Course-centered education appropriately will comprise the bulk of your undergraduate program. The broad spectrum of courses in the undergraduate catalog suggests the richness of opportunities within the regular academic program, a minimum of which may be elected during the four years of an undergraduate career.

In addition, a variety of approaches placing a premium on independent study and individual initiative is provided: in the freshman year tutorial work and special (honors) sections and courses are open in a number of departments. You may wish to request a tutorial in order to become more fully involved in intellectual inquiry. If you are able to accompany one of your introductory courses with a tutorial, you will probably be able to concentrate on four fields (exclusive of physical education) and have all the advantages and challenge of working at greater depth in a smaller number of subjects. Alternatively, you may request admission to a special (honors)

section or course. In such offerings greater emphasis will be placed on fundamentals, and on discussion and independent study. With regard to either possibility, it should be noted that there is a significant relationship between your interest in and ability to profit from later independent or individual modes of approach and your involvement in this type of study during your freshman year.

Beyond the first year you may take advantage of techniques such as auditing courses when a crowded schedule does not permit electing them for credit, or "reading out" of an introductory course during the summer in order to move more quickly to advanced work in the field. In the junior or senior year you may engage in seminars, independent study to pursue a topic or field of interest that is not developed in a formal course, or in original research to develop skill as a scholar.

In addition, much meaningful education is truly "informal." Talks, colloquia, films, art exhibitions, plays, and concerts—many sponsored by student groups—fall in the "informal" category as does the self-supervised pursuit of any line of intellectual inquiry. Judiciously selected, and accompanied by reading and discussion inspired by the activities, such informal education is often learning at its best.

It is neither possible nor desirable that you make binding decisions about your four-year course program or your participation in upper-level programs of independent study until you have sharpened your interests, gained intellectual sophistication, and acquired a firm background. Yet retaining the initiative in your education, planning ahead—however tentatively—so that you can evaluate your experiences within a framework of examined goals and aspirations—is fundamental to your total program. Accordingly, you are urged to plan ahead now even though you may revise your ideas several times as you progress.

FRESHMAN COURSES AND DEPARTMENTAL MAJORS

The following expanded descriptions of courses open to freshmen will prove useful, in conjunction with the material in the *Bulletin of Undergraduate Instruction*, in the preparation of trial course programs for the freshman year.* Courses numbered 50 or above are open to first semester freshmen only via advanced placement.† Accompanying the course statements are descriptions of the programs of concentration (or majors) available through the various academic departments. Each department offers one or more majors in which a student may specialize and bring to focus his interests.

For the incoming freshmen the descriptions of majors are relevant in terms of planning. Though thoughts of an area in which to concentrate may be vague, a freshman will in part be guided by such ideas even as he works out a course program for the first semester of his college career: in that semester each student will wish to explore at least one course in the area most congenial to his interests.

Through the summer and the first semester all students will be formally advised by appropriate college officers and faculty members specially designated to assist them. The earliest opportunity to declare a major and be formally advised by a faculty member in the department of choice will occur in March. From the outset, however, informal advice and counsel may be sought from the Supervisor of Freshman Instruction and Director of Undergraduate Studies in the appropriate department, officers who are designated by name in the undergraduate *Bulletin*. All students will be asked to choose a major no later than the spring semester of their sophomore year.

*The *Bulletin* provides a statement of the rationale of the undergraduate curriculum, a description of requirements for degrees and majors, and a complete listing of undergraduate courses. Students in the School of Nursing should consult the *Bulletin of the School of Nursing*.

†Exceptions are Economics 57, English 51, Geology 51, Mathematics 51, and Sociology 91, which are open to first semester freshmen. Psychology 91 is open in the spring semester to freshmen.

AIR FORCE AEROSPACE STUDIES

(Trinity College and the College of Engineering)

Aerospace Studies 2 (Fall or Spring)

Defense of the United States

A student should request enrollment in Aerospace Studies 2 *only* during Freshman Week after conversation with representatives of the Aerospace Studies Department. See the statement below for more information.

Aerospace Studies

Freshmen who wish to obtain a commission in the Air Force while earning a degree may do so by enrolling in one of two Air Force ROTC programs offered at Duke. They may obtain full particulars no earlier than Freshman Week but will want to talk with representatives of the department about the programs at that time.

Students not interested in scholarship assistance may defer enrollment in Air Force ROTC courses until the junior year. Students wishing to enroll in the two-year program, must apply for entry into the cadet corps during the spring of the sophomore year; attend a six weeks summer encampment at an Air Force Base during the summer between the sophomore and junior years; and enroll in one three semester hour AFROTC course for each of his remaining four semesters.

The student interested in scholarship assistance, should enroll in the four-year AFROTC program. He will enroll in Aerospace Studies 2, "Defense of the United States," two semester hours, either in the fall or spring semesters, but preferably in the spring. This course involves a study of the causes of world conflict, the problems of United States security, and the role of the Armed Forces as instruments of national policy. During the fall semester freshmen will normally not be enrolled in Aerospace Studies courses. In addition to the single course requirement during the freshman year, the student must participate in leadership laboratory, one hour each Monday afternoon, during both the fall and spring semesters.

ANTHROPOLOGY

(See Sociology and Anthropology)

ART

Art 1 (Fall), 2 (Spring), Introduction to Art History

Art 1-2 serves as a general introduction to studies in archaeology, art history, and criticism. Emphasis is placed on the chronological

development of architecture, sculpture, painting, and minor arts as material manifestations of culture of Western man from ancient to modern times. In addition to revealing cultural history, the course introduces the student to principles and terminology related to form, materials, and techniques in the visual arts and develops within the student some insight for critical judgment and discrimination of works of art. Although Art 1-2 is not prerequisite to upper-level courses, the orientation it provides is helpful in further art studies.

Art 53 (Fall), 54 (Spring), Beginning Studio

Art 53-54 is a beginning studio course with primary emphasis on drawing. It is prerequisite to further courses in painting or printmaking and may be taken by freshmen only by consent of the instructor on evidence of previous work. It requires three afternoons per week. Equal hours in art history or theory are required to validate studio credit but these need not be concurrent. Please note that Art 1L-2L will not be offered in 1966-67.

The Major in Art

The field of art embraces two areas—the practice of art and art history—which represent different, but not mutually exclusive, avenues for the acquisition of knowledge and experience in the visual arts.

Courses in the practice of art serve the purposes of a liberal education because they are concerned with basic skills in drawing, painting, and printmaking through which a student may gain sufficient experience to realize his interests and aptitudes. The program at Duke does not offer professional training in specific skills, but a talented student may enter a graduate or professional school and expect to accomplish professional objectives within a three year period of concentration.

Art history is a relatively new member of the academic family of humanistic studies which was formalized only in the early part of this century. The concept of "art history" belongs, however, to the 18th century when J. J. Winckelmann first perceived the value of interpreting works of art as human data to reconstruct the social, religious, cultural, and intellectual climate within which man lives at a particular moment of history. The popular notion of "appreciationism," as such, is not a function of art history. As an academic discipline art history is first of all an aspect of cultural history and merges further with other humanistic areas, such as philosophy, re-

ligion, and literature. By the nature of its research methods and documentary sources it presupposes a concurrent development in language tools.

The two courses which will define for the beginning student the fields of art history and studio work are described above.

The student selecting art as his major will elect either art history or design for concentration. In design he will follow a prescribed sequence of courses designed to lead him from basic problems in drawing and design to the art of painting and graphics. In the history of art he will effect a chronological spread of area courses and select one area for specialization.

The department offers an honors program in art history which leads the superior student into independent study and research as a prelude to graduate study in the field. Special lectures, traveling exhibitions, and art films are arranged by the department or the Duke University Student Union, and field trips are arranged in connection with art history and studio classes from time to time.

BIOLOGY

Biology 1 (Fall), 2 (Spring), General Biology

This new course will be taught on a collaborative basis by the Departments of Botany and Zoology as an introduction to biology both for students who have had some contact with biology and those who have not. In it the principles underlying the functional structure of plants and animals will be emphasized.

The surveys of plant and animal diversity in this introductory course in biology are linked by their common elements: structure and function of cells; replication of heredity material; differentiation of cells; geological history of the biota; composition and interrelationships of communities. While stress is placed on appropriate plant and animal materials in the course to illustrate prime biological principles, the organization of lectures, laboratories and discussions is such that the uniqueness of the plant and animal groups is retained.

The principles developed in lecture are illustrated in the laboratory exercises. Important relationships of the other natural sciences and mathematics to plant and animal biology are explored and evaluated since advances in chemistry, physics, mathematics and biochemistry have made clearer certain biological principles common to all organisms. Although a precise understanding of plants

and animals is obviously important, it is equally necessary that the student recognize unsolved problems or controversial issues in biology. The student is accordingly encouraged to develop the ability to perceive, to interpret experimental data, and to draw conclusions.

NOTE

General Biology serves as the introductory course in both the Departments of Botany and Zoology and is prerequisite to advanced studies in either. The student interested in concentration in biology is directed to the materials described under the Botany and Zoology Departments. Duke does not have a Biology Department or a biology major program as such.

BOTANY

The introductory course is described above under Biology.*

The Major in Botany

As a fundamental division of biology, the plant sciences have a significant role in developing both the modern aspects of biological knowledge and continuing the basic disciplines of classification and structure. The Department's curriculum for undergraduates thus seeks to provide the major with the theory, the laboratory and field training that will develop a broad working mastery of biological principals and be the foundation for advanced work.

Although botany is concerned traditionally with plant structure and function, this concern does not reflect the full province of the Department's undergraduate curriculum. Following the introductory biology course, a major is expected to select courses in four of the following basic fields: anatomy, ecology, heredity, morphology, physiology, or taxonomy. Later he has a wide latitude of choice in courses offered by the department and other science departments. Since the breadth of possibilities is great, the major who discovers his particular interests early may best be directed into a curriculum which will prepare him for advanced studies in biochemical or molecular plant or animal biology, marine biology or biological oceanography, or college or secondary school teaching, and many

*Entering students with unusual secondary school preparation in biology, e.g., two or more units of biology or attendance at an NSF Summer Institute, may elect to qualify for a more advanced course in botany. They should appear for a qualifying test administered by the Botany Department at Duke during Freshman Week.

others. Advanced courses in the natural and physical sciences may be counted toward the major.

The undergraduate major does not concentrate in a particular field of the plant sciences. With the recent advances in biology coming from techniques and concepts developed around plant materials, and the need for a broad basic knowledge of fundamental plant disciplines, the modern botanist must have a degree of competence in and an understanding of the whole field of plant biology and its contributing disciplines.

Recognizing its responsibilities in providing students with the opportunity to explore plant biology through the medium of independent study and research, the Department of Botany subscribes to a liberal program of training not directly connected with formal course work. The Department provides some financial support allocated specifically for undergraduate independent study in a program aimed at enrichment rather than acceleration. The work often carries credit and may involve study at other institutions or in territories outside the United States. Qualified students are often selected as participants in faculty research on campus or at the Marine Laboratory. Whether or not one qualifies for the departmental honors work or graduation with distinction, the major in botany with its biological implications should prepare the dedicated and willing student for later occupations in industry, education or a combination of research and academic pursuits.

CHEMISTRY

Chemistry 1 (Fall), 2 (Spring), General Inorganic Chemistry

The first semester is devoted to a consideration of the principles of chemical science. The properties of matter—gas behavior, solution phenomena, quantitative aspects of chemical reactions, chemical equilibrium—are related to the molecular structure of matter and further to the structure of the atoms themselves. The quantitative aspects of the principles are discussed extensively and, in the laboratory, experiments illustrating these principles are carried out.

In the second semester a systematic study of the chemistry of the metallic and nonmetallic elements, as a function of their position in the periodic table, is supplemented by laboratory exercises in the quantitative analysis of some twenty common ions by semi-micro techniques. An introduction to organic chemistry stressing structural isomerism and functional groups is also included.

While these courses serve as prerequisites for subsequent courses in the Department, they also provide for the non-science major an experience of some depth in the method, concept, and problems of a broadly based scientific discipline.

Chemistry 41 (Fall), 42 (Spring), Advanced General Chemistry

For able freshmen with extensive secondary school preparation in chemistry the department offers a special course. In Chemistry 41 attention is given to atomic and molecular structure, chemical kinetics, the liquid and solid states, equilibrium, and chemical thermodynamics. Introductory calculus is used during the latter half of the course. Paperbound books, mimeographed notes, and parallel reading are used.

In the laboratory the major portion of the semester is devoted to independent investigations. In this work students are asked to formulate hypotheses to explain the behavior of simple systems and to devise and carry out experiments to test their hypotheses.

In Chemistry 42 are treated (1) the structure of simple organic molecules and complex ions in terms of simplified valence bond (molecular orbital) theory, (2) the physical chemistry of aqueous solutions, and (3) electro-chemistry. Where applicable the thermodynamics introduced in Chemistry 41 is employed.

The laboratory in the second semester applies volumetric, gravimetric, colorimetric, chromatographic and instrumental procedures to problems in quantitative chemistry and the determination of physical constants.

Preliminary placement in the course is predicated upon SAT verbal and mathematics scores usually above 650, an intended science or mathematics major, and other CEEB tests scores, if available. All students given tentative placement will be asked to take a chemistry qualifying test during Freshman Week. At this time there will be an opportunity to indicate one's interest in participation and to discuss the course with the instructor.

The Major in Chemistry

Chemistry is defined as the science of substances and is concerned traditionally with structure, properties, and the nature of reactions which change one substance into another; yet this definition fails to suggest the full province of the science. Because of the breadth of concern of chemistry—its relation to physics and the engineering and life sciences—chemistry is also a central figure in

a significant, exciting, technological and scientific revolution now gaining momentum.

In the field of chemistry, whether one's interest is in the basic or applied science, he will pursue his study at one time on the macroscopic level where "bulk" phenomena involving perhaps 10^{20} molecules are observed, and at another time on the submicroscopic level where the intimate course of reactions between individual molecules is deduced.

The program for the chemistry major is designed to give a basic understanding of the fundamental principles of chemical science and a practical knowledge of common laboratory techniques and experimental procedures. The curriculum for the Bachelor of Science degree, approved by the Committee on Professional Training of the American Chemical Society, gives intensive training in chemistry and the related disciplines of physics and mathematics, while in the curriculum for the Bachelor of Arts degree, somewhat less than half a student's time is devoted to his major and related work.

The following sequence of courses is common to both major programs. *General Chemistry* emphasizes the general theory and behavior of matter in bulk and the structure, properties, and reactions of many elements and compounds. The Periodic Table and the chemical bond are stressed. *Organic Chemistry* describes the synthetic methods, systematic behavior, and the geometry of individual compounds of carbon as well as some of the theory involved. *Physical Chemistry* offers a critical, rigorous examination of the principles underlying all areas of chemistry including the states of matter, quantum phenomena, thermodynamics, and a thorough treatment of chemical kinetics. *Analytical Chemistry* treats in depth the theory of solutions and includes instrumental methods, such as spectrophotometric, electro-analytical, and chromatographic techniques. *Inorganic Chemistry* applies the principles of physical chemistry to a study of inorganic systems.

Depending on the type of curriculum, advanced work is also pursued in one or more of the following areas: inorganic chemistry, qualitative organic analysis, nuclear chemistry, chemical instrumentation, organic preparations, and physical-organic chemistry.

The Department of Chemistry recognizes its responsibility to those students whose secondary school preparation has been exceptional and whose ability has been clearly demonstrated. For these gifted students, the Department offers a different and challenging curriculum during the first year aimed at enrichment rather

than acceleration. During the second year, these students are taught in special recitation and laboratory sections of the regular course; in the senior year they may pursue independent study and research in the Graduation with Distinction program.

CLASSICAL STUDIES

Greek 1 (Fall), 2 (Spring), Course for Beginners

The purpose of this course in the elements of classical Greek is to provide the foundation for development of the ability to read Attic prose, and at the same time to give the beginning student an introduction to the importance of the achievements of the ancient Greeks and their contributions to modern civilization. The most common vocabulary and idioms in Greek are studied, and emphasis is placed on the syntactical usages most frequently encountered in Greek authors. To lend vitality to the study of grammar, selected passages from many notable Greek writers are read and analyzed. Also, in vocabulary study attention is given to English words derived from Greek.

Greek 15 (Fall or Spring) Mythology

Greek mythology introduces the student to the subject by stressing content while devoting some attention to sources, types, and analysis of the classical myths. Myth arises as man's imaginative response to facts of his experience in physical, social, and historical contexts. In consequence, myths form the seed of inspiration for the greatest works of Hellenic art and literature. These creative influences of the myth inhere in surviving sculpture, painting, and poetry, and in their continuing power to stimulate more recent artists and poets. Greek 15 is offered as an elective for freshmen in either semester, and no knowledge of the Greek language is required.

Latin 1 (Fall), 2 (Spring), Course for Beginners

Latin 63 (Fall) Cicero's Orations, 64 (Spring) Vergil's Aeneid

Latin 91 (Fall), 92 (Spring), Latin Prose and Poetry

The beginning course provides the fundamental grammar and, toward the end of the year, the reading of some easy prose. In Latin 63, 64 the student will read some of Cicero's orations and part of Vergil's *Aeneid*. If he begins in 91-92, he will find himself reading selections from great writers of prose, such as Pliny or Sallust, and great poets, Catullus, Horace, and others.

The two more advanced courses purpose to introduce the student to masterpieces of one of the world's greatest literatures, and to develop and promote a capacity to read Latin with understanding, appreciation, and enjoyment.

The Major in Greek

The major in Greek is concerned with the literature and history of ancient Greece. All students take the same core of work. The second year is devoted to continuous reading of Greek prose and poetry, and to review of grammar and vocabulary. In the first term, several of the shorter Platonic dialogues are read, such as *Ion*, the *Apology*, and *Crito*, with a view towards developing a facility in reading Greek prose and an appreciation of the importance of Socrates in the history of Greek thought. The second semester is devoted to a study of several plays of Euripides, including the *Alcestis*, as an introduction to the problems of reading and interpreting Greek poetry in general, and the drama of Euripides in particular.

The third-year course serves the general function of increasing the student's knowledge of the Greek language and literature. The chief aim of the first semester's study, Books I-III of Homer's *Iliad*, is to show the greatness of the poetry of Homer. Emphasis is laid on the highly poetic character of his language; a closer acquaintance with his poetic usage is achieved by requiring the students to give Attic prose equivalents of the words and expressions that Homer uses, with a view to showing how far above the level of prose Homer's language rises. Later the class uses Matthew Arnold's four essential characteristics of Homer's poetry as a basis for criticism, and with these criteria tests the great poetic translations from Chapman to Bryant to determine which of the characteristics they possess and which they lack. Then the students in turn are called upon to write a verse-translation of a number of lines, and the same criticism is applied to their productions. The outcome of this method of study is a keener appreciation of the majesty and grandeur of Homer, and of the sublime heights of his poetry. The second semester's work consists of a study of selected books of Homer's *Odyssey* followed by selections from the Greek lyric poets.

In the fourth year the student is familiarized with the dramatic poetry of the ancient Greeks. Introductory lectures on the origin and development of Greek drama (tragedy and comedy) are followed by a study of three typical masterpieces selected from the works of Aeschylus, Sophocles, and Aristophanes. In addition to

translation, special emphasis is placed upon the assimilation, transformation, and reproduction of the thought of the authors into readable and idiomatic English. This develops literary sense as well as analytic ability. Attention is given to the influence of Greek drama on subsequent European literatures.

In addition work is given in Greek prose composition and in Greek history. The first of these courses seeks to impart a knowledge of the principles of language in general, and of the forms, vocabulary, and syntax of Greeks in particular, and thereby to cultivate the student's memory and give him a clear conception of the exact relation of clauses to one another.

In the second course a survey of the origin and progress of civilization in the Greek world from the Late Bronze Age to the Macedonian conquest is presented. Throughout the course strong emphasis is laid on underlying causes and historical significance.

The Major in Latin

The major program in Latin involves the study of works of Latin authors, commencing with the "third-year" courses in Latin prose and poetry. Lower-level courses, primarily in the mechanics of the language and the development of reading ability, are taught with the purpose of eliminating, to the greatest possible extent, the obstacle of a language which is not our own. The invention of writing gave to language, and the thought which it conveys, a life which the spoken word loses in the moment of speaking. A language "lives" then, not only in present utterance, but also wherever in reading it constitutes a bridge of communication. Latin is not generally in current spoken use, but a knowledge of the language, as the medium of expression, is prerequisite to full and satisfactory comprehension of the thought and literary achievement of the Romans as captured in their writing.

While it is certainly true that a command of Latin is beneficial to the speaker and reader of English, and while it may be that the discipline of the language is valuable in other application, the major importance of Latin lies in its use, as the instrument of expression, by some of the earliest, and still notable, thinkers of mankind. Western civilization draws its beginnings and early development from the ancients, and in the widespread sharing of their influence it has its principal bond of unity. Artists, philosophers, and men of letters have continually returned to this source and foundation; and the reestablishment of communication with the ancients and their cre-

ations was the birth of that Reawakening which was to be a parent of the Modern World.

The major program leads into intimate acquaintance with several of the great literary monuments and their authors; the incomparable prose styles of Cicero in philosophy and rhetoric, of Tacitus in historiography; the powerful, mordant satire of Juvenal, the modern-sounding scientific thought and theory of Lucretius. As education, these studies, like those of other great literatures, or philosophy, or fine arts, are a substantial contribution to the individual's cultural development and personal enrichment. And as training they are by no means to be despised or ignored in these days when the spokesmen for industry, business, and the professions with unanimous accord continually emphasize to their prospective recruits the virtues and values preëminently of education in the liberal arts. This curriculum furnishes the intending teacher in the secondary schools with background and depth, and the student who goes on to graduate work in the Classics with the necessary foundation for advanced study.

ECONOMICS, BUSINESS ADMINISTRATION, AND ACCOUNTING

Economics 1 (Fall), 2 (Spring), Introduction to Economic Problems and Policies and the Evolution of Economic Ideas

Economics 1 aims to give the student an understanding of the present day American economy and the challenge to it from centrally planned economies. It considers the policies that are used or proposed to deal with problems of depression, inflation, growth, and automation.

Economics 2 is a study of man's economic activities and his ideas about them from the ancient world to the present day. Emphasis is given to the historical roots of present day economic ideologies.

Economics 57 (Fall), 58 (Spring), Principles of Accounting

Economics 57 provides a basic knowledge of accounting and a consideration of financial statements. Attention is focused on the nature and purpose of accounting, the measurement and classification of economic data, and accounting reports as a tool of management and the investor.

Economics 58 is concerned with the problems of accounting for and control of monetary assets and costs, the problems of capital

stocks and the elementary problems of decision making. The relationship of the firm and national income accounts is examined.

The Majors in Economics, Business Administration, and Accounting

Three distinct programs of study are offered in this area. A student may major in economics, business administration, or accounting. Regardless of the major chosen, the student will be assured of a broad-guage education. The courses of study comprising these programs have been designed with a full awareness of the liberal arts tradition to which the University is committed. The Department feels strongly that its mission is not to train students for their first job after graduation but to instill those qualities of mind which will fit them for the responsibilities that will arise in their careers. Experience over the years has indicated that prospective employers prefer the broader background.

The general focus of the three majors in the Department is on the economic process—past, present, and future. Knowledge of this process is an important part of a liberal arts education. How society decides what to produce, how to produce, and who will enjoy the fruits of production in large part determines the nature of society, philosophically, socially and politically.

The major in economics is concerned with the economic process from a conceptual and analytical point of view and is especially recommended for those who intend to go on to graduate work in economics. It also provides an excellent background for students who intend to study in other social sciences, law, or history.

Business administration majors build on the same base but emphasize the process by which the firm makes decisions and plays its role in society. In the student's upper level studies, he is directed to courses which stress in greater measure knowledge and techniques useful in the preparation for a business career. The limited specialization required for a degree can be further enriched by the choice of elective business courses. Normally a student who intends to do graduate work in business is advised to choose the economics undergraduate major.

The major in accounting, while building on the same base, is more concerned with the analysis and presentation of data which arise from the firm's operations. These data enable the firm and society to act more effectively. Students who believe that accounting is their future vocation and who desire a more professional prepara-

tion may elect either the public accounting program, which prepares them for the Certified Public Accountants Examination, or the industrial accounting program.

In the senior year, majors in the department may pursue independent study leading to Graduation with Distinction.

EDUCATION

The Majors in Education

The main purpose of the Department of Education is to provide professional preparation for teachers and other personnel for the schools. For this reason many of the courses offered by the Department are of primary interest to students who intend to teach. Such courses deal with principles and materials of instruction and their application to the classroom. However, the Department offers several courses in the area of liberal education which will help in developing a better understanding of people and society. Most of the courses in social and psychological foundations of education are in this category.

At the undergraduate level, Duke University prepares teachers for both elementary and secondary schools. Prospective elementary-school teachers major in elementary education, since in this way they may best meet the dual requirements of gaining knowledge and skill in all of the areas taught in elementary school and acquiring an understanding of child development and learning theory. The University prepares teachers for the secondary schools in the fields of art, English, foreign languages, physical education (women), mathematics, music, the sciences, and the social studies. Prospective secondary-school teachers major in the academic department of their principal interest and should choose related work which will strengthen their preparation for a teaching career. There is a special program and a major in science education designed to provide a broad background in the sciences and mathematics.

Introductory Psychology, Psychology 91, is prerequisite to all programs in teacher education. This course provides an opportunity to develop a background for understanding the behavior of children and adolescents. It should be taken in the sophomore year. Social Foundations of American Education is also required for all programs in teacher education. It is intended to acquaint prospective teachers with underlying viewpoints, problems, and issues of education. It should be taken in the junior year.

Students preparing to teach devote an entire semester of their senior year to courses in designated subject matter and professional education, and to student teaching. During the last half of this semester they are engaged in full-time observation and student teaching in schools.

Advisers in the Department of Education will help in planning a program that will serve individual student needs. For example, each student's program must be designed to meet the requirements of the state or states in which he desires certification. Students may also be helped by their adviser to work toward a decision as to whether or not they should teach and, if so, what subject or grade.

Anyone planning to teach who majors in another department should *make an appointment with a Department of Education adviser prior to each registration period* for the proper planning of his program. Such a contact will insure that a place will be available in the student teaching program in the senior year.

In the senior year, majors may pursue work leading to Graduation with Distinction.

ENGINEERING STUDIES

(College of Engineering)

*Engineering 1 (Fall), 2 (Spring), Engineering Design;
Engineering 23 (Spring) Statics*

The first two courses introduce the student to the "engineering process" through the solution of selected problems of engineering design with the aid of the tools of engineering graphics—an important form of communication and a means for visualizing solutions. Since the problems which are chosen represent real engineering needs, the student is given the opportunity not only to draw upon his existing knowledge but is stimulated to acquire new knowledge in the process of proposing and developing his solutions.

In the second semester the problems are larger in scope than those of the first semester and involve larger design teams, the inclusion of economic considerations, and attention to ultimate feasibility. Graphical analysis is extended and includes elementary nomography and the development of graphical calculus. An introduction to the digital computer is provided.

The third course, statics, deals with the analysis of forces and their equilibrium as applied to machines and structures and other engineering components and systems which must be designed to sustain applied loads. The principles of statics are basic to the

analytical description of many engineering problems and set the stage for more advanced studies that follow. Included in statics are descriptions of the effects of friction, the stability of various structures, and the equilibrium of forces which are internal to and distributed throughout a body.

Majors in Engineering Studies

The ultimate purpose of engineering is to bring into being new devices, machines, processes, and structures, which contribute progressively to the development of civilization, and to do so at minimum cost in time and money. Central to this concept of engineering is that of creativity.

The unique contribution of the professional engineer, that of feasible and creative design, revolves around the effective putting together, or synthesis, of ideas and information relevant to the problem at hand. Characteristics of the engineering process are uniqueness or improved function, best possible use of people and materials, and practicality. Essential to the successful fulfillment of the engineering function are an adequate knowledge of both existing and new scientific information, an ability to combine this information effectively, an understanding of production processes and fabrication methods, and the exercise of professional responsibility for the welfare and protection of people.

Whereas engineers as individuals may perform specialized services within the total science-technology spectrum, it is the feasible, creative design concept which provides purpose, perspective, and incentive in engineering activity. Research and development, management, production, sales and services, and teaching are all important engineering activities as they occupy supporting roles to the central *creative* purpose of engineering.

It is essential to distinguish the aims of engineering from those of science. While these fields are closely interdependent, their objectives are fundamentally different. Science is involved in the *quest* for knowledge, engineering in its *use*. The scientist seeks to understand and describe clearly and rigorously the laws which govern the behavior of the physical world. In contrast, the engineer seeks to devise a practical solution to a human need and must make many compromises and judgments of value in doing so. His use of science and mathematics is an important means to this end.

The dependency of engineering on mathematics and science has increased greatly in recent years and promises to continue to grow.

For this reason the engineer needs a strong background in mathematics and science.

The educational program in engineering at Duke is directed toward the following objectives:

- a. To produce engineers who are equipped to function at the highest professional level, not only today, but for several decades, regardless of the scientific advances that the future may bring. To meet this objective, the program seeks to provide a fundamental understanding both of the *science* of engineering, which is based on mathematics and the physical sciences, and of the *art* of engineering, which depends on human imagination and judgment.
- b. To produce engineers who can function intelligently within the economic and social framework of our culture—persons who are able to look from the past through the present into the future in terms of material wants and needs, and who are able to organize the human effort and financial resources necessary to provide the machines, goods, structures, and services that will meet those needs and wants.
- c. To produce engineers who recognize their responsibilities as citizens of their communities.
- d. To produce engineers who seek to continue aesthetic, ethical, intellectual, and spiritual growth.

The first of the four objectives is served primarily by the required and elective courses in mathematics, chemistry, physics, and engineering; the last three objectives, mainly by the required and elective courses in the humanities and the social studies. All four objectives are served by various aspects of the extra-curricular program, including those of the general university program.

A prime requirement for successful practice of engineering is the ability to communicate facts and ideas. The engineer must be able to listen and read and to speak and write with precision, clarity, and understanding. Consequently, certain courses designed to improve the ability to communicate are recommended, and effective graphical representation, writing, and speaking is expected in all course work.

The engineering curriculum leads to the degree of Bachelor of Science in Engineering following the completion of four years of study and provides opportunity for majors in the professional fields of civil, electrical, and mechanical engineering, as well as for pro-

grams in interdisciplinary fields such as bio-engineering, engineering mechanics, energy conversion, materials, systems, and controls.

A program of honors work leading to Graduation with Distinction is available in any of the majors in the senior year.

The fields of civil, electrical, and mechanical engineering are briefly described in the paragraphs which follow.

Civil Engineering

The practice of this profession may involve research and development, conception and planning, design, construction, and/or maintenance of constructed engineering systems or facilities. As are other engineers, civil engineers are sometimes involved with manufacturing, mining, or generating operations, but the identifying characteristic of the field of civil engineering is its relation to constructed industrial or public systems or facilities.

Opportunities exist for private practice, employment by industry as well as government at all levels, and combining other interests such as business and law with civil engineering. Intimate involvement in the reconciliation of man's increasing demands and the earth's limited resources of water, air and land suggests that work done by civil engineers is significant and of large scale. Civil engineering demands of its practitioners initiative, vision, and good judgment in addition to adequate preparation in technical subjects.

Electrical Engineering

Electrical engineering utilizes the electric and magnetic forces of nature and the properties of matter to supply human needs. Because electricity is the most flexible form of energy available to man, electrical engineering influences the lives of most of the world's population. This profession is concerned with the *processing and transmitting of information*—as in television, radar, radio, electronic measurement, and computation. It is equally concerned with the *processing, transmitting, and controlling of energy*—as in rotating machines, power systems, and automatic industrial processes. It provides most of our labor-saving home appliances and many of the instruments of scientific research and modern medical practice.

Mechanical Engineering

Mechanical engineering includes the design, development, operation, and maintenance of all types of machines; the designing of power plants and factories, the selection and installation of their

equipment; the development of systems of operation; and the organization and administration of plants and industries.

The mechanical engineer is concerned with development, design, manufacture, and operation of prime movers, such as steam, gas, and hydraulic turbines, internal combustion engines, and to an increasing degree, in the production and utilization of nuclear energy; of equipment for the transmission of power from the prime movers to the power-using machinery; of the power-using devices, such as pumps, compressors, propellers, airplanes, missiles, ships, trains, automobiles, electrically-driven mechanisms, chemical process equipment; of indicating instruments, regulators, and of equipment for guidance, automatic and manual control. The mechanical engineer is heavily involved with the design and control of rockets, missiles, and spacecraft.

Mechanical engineers are employed in industries such as aeronautics, missile, space vehicle, automotive, ship construction, manufacturing, process, air conditioning, refrigeration, heating and ventilating, petroleum, plastics, wood, textile, power, fuel, nuclear engineering, and in industrial research and testing.

ENGLISH

English 1 (Fall), 2 (Spring), Freshman Composition

The reading in English 1-2 is drawn from the writers in England and America of this century because such writing is closest to the interests and experiences of the young men and women of this generation. Once a week in a general lecture the reading assignments are discussed by some qualified member of the Department. This lecture is the starting point for a discussion of the reading in the classroom, in the conference, and among the students themselves. Besides the general lecture, the student each week attends one meeting of his class (or section), made up of about eighteen members. Here his own instructor directs a discussion of the week's reading or talks about those problems of composition which are pertinent to his students. Most problems of composition, however, are individual, and so it is in the weekly tutorial conference that the student is likely to receive his most valuable assistance. In the conference, the instructor reads, discusses, and grades the weekly theme. The student not only is given the reasoning behind the grade imposed upon his theme, but he also has a chance to explain his own position and to find out ways of improving his

work. It is here especially that the student realizes that he is not an anonymous member of a crowd; instead, the whole course is focused on him and is designed for his individual benefit.

Through these varied approaches each freshman, then, receives the advantages of the three historic modes of instruction: the formal lecture, the group discussion, and the private conference.

Special Writing Section of English 1, 2

All Duke freshmen, except those who have passed the Advanced Placement examination, will take English 1 and 2. There is, however, one section given for those who have shown a particular aptitude for descriptive and narrative prose and who wish to undergo a further rigorous training in these types of writing. A final selection will be made during Freshman Week by Mr. Reynolds Price, the instructor, after a further qualifying test.*

English 51 (Fall or Spring), Public Speaking

The ability to express oneself orally is a valuable asset to anyone, and is a necessity for those going into the professions of law and the ministry. English 51 is designed to develop this skill and to give the student the poise and confidence necessary to think and speak freely before an audience. Particular attention is paid to the gathering and organization of materials.

The Major in English

The study of literature is, and will always be, one of the broadest avenues to a liberal education. It holds wide opportunities to approach and synthesize the whole length and breadth of human knowledge and to deal, directly or indirectly, with the great minds of the past and present. These are, essentially, very "practical" functions just as, at the other pole, to study literature is to gain insight into the very practical art of communicating through the written word. But perhaps most of man's conscious activity takes place neither on a high metaphysical plane nor on the level of the daily job; on the middle plane where he often lives and acts, literature

* Please take note that the regular sections of English 1 and 2 with their training in expository writing are more suitable for most students, however great their ability; the special section is not reserved for "high-scorers," for students with higher scores may be found in the regular sections. Students who have taken the Advanced Placement examination in English and who are interested in narrative writing may apply for this section and if they receive a passing AP score, may then decide whether to take the qualifying test for the special section or to enroll in a sophomore course.

holds the finest resource for understanding human character and all its complexities, for acquiring a sensitivity to the human condition and its workable values. Finally, everyone has to some degree an aesthetic drive: the study of literature gives it depth, direction, and rich satisfaction.

The student choosing a major in English concentrates in the study of English and American literature. The English Department has a varied program of offerings, and the major is required to satisfy a pattern of distribution rather than to take specific courses. As a result, the major will find his academic program marked by flexibility and individual responsibility. Usually he will be able to follow his preferences within a wide range of English and American literature and can also take two or more courses in some restricted area such as Elizabethan drama or nineteenth-century English literature or contemporary fiction, poetry, and drama.

The size and diversity of the Department also give him unusual freedom in the choice of his teachers. If he is wise, he will exploit the opportunity to select teachers who have differing approaches to literature and to classroom methods. He has, furthermore, a wide freedom in his program of related work, though he is helped in his planning by a faculty member who acts as his academic adviser.

Opportunities for creative expression are found in the *Archive* (the campus literary magazine), in the *Chronicle* (the newspaper), and in student groups devoted to speech, debate, and the drama. The Anne Flexner Memorial Award in Creative Writing is also given annually.

The Department poses some formal challenges to the more able student. In addition to the regular and traditional courses in literature, composition, speech, and drama, the English Department has instituted a number of upper-level "Conference Courses," limited to twelve students in each, for close study of various aspects of literature. A special Senior Seminar is offered majors who are candidates for "Graduation with Distinction in English." This seminar stresses independent reading and the writing of a critical research paper. The Department also offers to every major in his senior year the opportunity to enter any among a dozen courses that are primarily designed for graduate students and that introduce him to a more technical and critical approach that he will usually meet in the conventional undergraduate program.

FRENCH

(See Romance Languages)

GEOLOGY

Geology 51 (Fall), 52 (Spring), General Geology

Geology 51, 52 offers a broad survey of the hard rock crust of the Earth and its softer mantle of debris and soil on which life depends. The first course deals with the forces which build up, change, and destroy the accumulated formations that make mountains, underlie the sea bottom and ocean basins, and floor valleys—the forces of wind and weather, running water and moving ice—and the underground forces of volcanism and diastrophism. Lectures are supported by the examination of common minerals and rocks in the laboratory and by the study of topographic maps. In the second semester the broad aspects of the physical history of the Earth and the evolution of life forms is studied. Basic principles used in reconstruction of the sequence of geologic events and the relative dating of these events is emphasized. The close interplay between the physical and biological history of the earth is stressed and possible causes and the significance of major trends and events is examined in terms of present day physio-chemical and biological processes.

The Major in Geology

Geology is the physical science concerned with the study of the earth. Some of the interests of geologists are the physical processes acting on the earth's surface (water, wind, ice), the composition of the earth (rocks and minerals), its structure (continents, ocean basins, mountains), its economic products (oil, gravel, water, uranium), and its past history (origin, shifting positions of land and sea, kinds of life present).

Men and women versed in geology are utilized by federal and state governments and industry to help solve such varied problems as the location of petroleum deposits or the nature of the moon's surface. A considerable number of geologists are engaged in a wide spectrum of research in such specialties as oceanography, seismology, volcanology, and astrogeology.

The basic training of a geologist following the introductory survey courses is in four fields: (1) minerals (2) rocks (3) stratigraphy (4) structure. Additional courses depend in part on the specialization desired by the student. Basic training extends beyond geology alone and into other sciences: physics, chemistry, biology,

and the mathematics. Fundamental principles and knowledge from all of these sciences is likely to be used in one specialty or another within the broad framework of geology. In some instances study in depth will be necessary within a related science for the student to be trained in a specialized field of geology. Thus the paleontologist must be trained in biology and the mineralogist in chemistry.

Undergraduates are encouraged to assist and in some cases to become junior partners in the various staff research activities.

GERMAN

*German 1 (Fall), 2 (Spring), Elementary German
German 63 (Fall), 64 (Spring), Intermediate German
German 91 (Fall), 92 (Spring), Introduction to German Literature
and certain 100 level courses for properly qualified freshmen*

"Elementary German" obviously must concentrate on grammar and structural language tools, adding as much reading of illustrative material as time allows. "Intermediate German," on the other hand, is chiefly concerned with reading (short stories, poems, etc.) combined with certain necessary grammar review. The facilities of the language laboratory are particularly designed for students in both of the first two years of German. Laboratory exercises are aimed at sharpening auditory comprehension, increasing fluency, and raising the general level of student language performance.

The Major in German

Germany and German-speaking countries have contributed many men of genius in a wide variety of fields: poetry, the novel, philosophy, music, medicine, psychology, and most of the natural sciences. A study of the German language is obviously a desirable and even required tool for opening up their achievements in these varied areas. A firsthand acquaintance with the German language, with the literature and social background of the Germanic countries, is therefore valuable and, in some cases, indispensable both to the future specialist and to the well rounded liberal arts student. Germany, even though divided, is still a major state of central Europe. Knowledge of its language, culture, and civilization is essential for knowledge of the history and culture of modern Europe, and of Western civilization.

A German major is required to take eight semester courses in the Department beyond the intermediate level. In the early years of study, language-laboratory facilities are of assistance. The German major is also asked to choose several courses among the var-

ious humanities, i.e., other literature courses, including English or American or Comparative Literature, French, Spanish and Russian literature as well as suitable courses in philosophy, history, religion, and linguistics. Study in these areas rounds out a liberal education.

The aim of the Department is to place language and literature study within the framework of Germanic civilization and European culture in general. The poets and writers of world influence (Goethe, Schiller, Hölderlin, Heine, and the modern figures of Rilke and Thomas Mann) are seen against the background of great musicians of Austrian and German birth (Bach, Mozart, Beethoven, Schubert, Schumann, Brahms) as well as the achievements of their greatest, most influential thinkers (Kant, Schopenhauer, Nietzsche).

What are the benefits of such a major? The purely cultural benefits cannot easily be summarized. Just as Goethe and Kant, Nietzsche, Mann, and Rilke have made significant contributions to world culture, so the figure of Goethe's Faust stands beside Hamlet and Don Quixote as one of the great figures in Western literature.

Beyond its contribution to a liberal arts education, this major leads into teaching (at all levels: elementary, high-school, college, and university) and toward the government's Foreign Service as well as into such channels, potentially, as the export and import trade with German-speaking countries (Germany, Austria, and Switzerland).

An opportunity for the experience of foreign study is offered through the Duke summer study program in Münster, Germany, as well as through approved Junior Year Abroad programs of other colleges and universities.

The department offers an honors program leading to Graduation with Distinction.

GREEK

(See Classical Studies)

HISTORY

History 1 (Fall), 2 (Spring), Modern History

Aware that almost every student who enrolls in Duke University will have had courses in history, the History Department has attempted to provide a course for freshmen which will be instructive and interesting not only to those students who have had little or no history, but also to those who have studied history for several years. Its introductory history course offers a student an opportunity to understand better how his own society has developed. It also

helps him to appreciate present-day problems in a way which the study of the past alone can supply. For example, the course emphasizes themes which are just as vital to an understanding of our own problems as they were to those of almost every century in the past. These themes include the rise of the national states and the conflict between liberty and authority within them; the problems of peace and war among these states; the economic practice and theories of modern times, especially the way in which capitalism has changed through the years; and the faiths and ideologies men live and die by.

Although a firm understanding of the way in which these themes developed is obviously of importance, equally important for the college student is the ability to evaluate critically historical writings and interpretations and to draw conclusions himself from the sources from which history is written. Consequently, considerable emphasis is placed upon encouraging the student to think critically and upon training in the techniques of historical investigation.

History 1x (Fall), 2x (Spring)

History 1x-2x is designed as a seminar-type course for students who have had a good background in European history, who can read and comprehend rather large amounts of historical material in a semester, and who are capable of examining historical problems with a minimum of attention to historical chronology. The Department determines those who are qualified by consideration of SAT verbal scores, completion of three units of high school history, and an interview with the student during Freshman Week. Students who have earned a score of three or higher on the Advanced Placement Examination in American history may also be admitted to the course.

The class will meet less frequently than the regular freshman sections, and each section of 1x-2x will number approximately twelve to fourteen students. Class discussions will be on readings assigned during the previous period, and debates may be arranged between members of the class on various topics. Various collections of source materials, pamphlets, paperback books, and articles dealing with some of the leading personalities and the major issues in history will be used during the semester. Semester projects in the form of written papers will be required. Short papers—critiques, book reviews, and essays—will also be assigned during the term.

History 43 (Fall), 44 (Spring)

History 43 and 44 are designed as tutorial courses for all freshmen who wish to supplement the regular introductory course. Meet-

ing once every week or two in groups of about four to twelve, students discuss books and articles that accompany but do not duplicate the materials in the introductory history course.

The Major in History

History seeks to develop insights into a particular body of human activity whether it be revolution in Russia, dictatorship in Napoleonic France, or the building of empires in the New World. To impart these insights courses in history strive to cultivate far-ranging minds and the kind of trained intellects that delight in pursuing a line of research or developing a good argument. As worthy components of a liberal education these courses espouse the view that the unexamined life is not worth living and the unexamined world is not worth living in.

At Duke a major in history is planned to allow students almost complete freedom in choosing their courses within the framework of the University philosophy of undergraduate education. Normally all majors are required to take the introductory course. In their remaining semesters of history, majors have considerable freedom of choice. The single mandatory stipulation is that two courses must be in an advanced seminar or on the senior-graduate level so that every student will have at least some opportunity for intensive investigation on a subject in an area of special interest. Beyond the work in history, the department urges majors in the department to broaden their understanding by exploring widely in the various disciplines other than history. The latitude provided within these requirements is perhaps best suggested by the increasing number of pre-medical students now majoring in history.

The History Department is in a position to offer an unusually wide range of subjects to prospective students, since all the fields offered by the Department are open to undergraduates. These fields are American (including Diplomatic, Colonial, 19th Century, 20th Century, the South, Civil War and Reconstruction, and Intellectual history), Western European (including Ancient and Medieval, the Renaissance, the French Revolution, 19th and 20th Century), English history and the British Commonwealth, Russian, Latin American, Indian and Pakistani, Far Eastern, Military, and Naval history as well as the history of science.

In addition to the individual courses offered in the various fields, the History Department has introduced a special program of seminars with enrollment limited to no more than a dozen in each to encour-

age students who are interested in doing advanced reading and research. Specially qualified students may also do independent reading and research under the supervision of a member of the staff. A "Senior Seminar," is provided for superior students, particularly those working toward "Graduation with Distinction in History." But whether one qualifies for "Distinction" or not, a major in history should help prepare a thoughtful student to enter the many occupations in life which are open to graduates of a liberal arts college.

LATIN

(See Classical Studies)

MATHEMATICS

Mathematics 17 (Fall) Introduction to Finite Mathematics
18 (Spring) Elementary Statistics

Mathematics 17 introduces students, early in their college career, to several concepts in modern mathematics. The first topics covered are close to students' experience, and the whole range comprises elementary logic, sets, vectors and matrices, and probability theory. Applications to problems arising in the biological, physical, and social sciences are stressed. In contrast to calculus, which deals with infinite sets and limiting processes, this course deals with finite sets of objects. Many of the most profound problems in mathematics are finite in character.

Mathematics 18 gives a brief but clear presentation of statistics as an applied mathematical subject. This course aims to develop both an appreciation for and an understanding of the basic ideas and methods of statistics. Topics studied include the summation of data, means and standard deviation, normal, binomial and other distributions, sampling, statistical estimation, and testing hypotheses.

Mathematics 17 and 18 are primarily designed for students who do not intend to major in a science.

Mathematics 21 (Fall), 22 (Spring), Introductory Calculus

Most students will begin their mathematical training with the course entitled Introductory Calculus. The concept of a function will be introduced, and trigonometric, logarithmic, and exponential functions will be given special attention. Graphs and applications of such functions will form a basic part of this course. In the section on plane analytic geometry, the equations of straight lines, circles,

parabolas, ellipses, and hyperbolas will be derived and properties of these curves will be studied.

In another part of the course the concepts of the calculus will be taught. The discussion of many of the types of motion that are of interest, e.g., the motion of molecules in a gas, the flight of an airplane, and the flight of a rocket require ideas that form the basic part of calculus. The calculus concepts also enable one to find the lengths of curves, surface areas, and the volumes of irregularly-shaped solids. In this course students will be given the tools and calculus concepts that will enable them to solve many of the above-mentioned types of problems.

Mathematics 41 (Fall), 42 (Spring)

For students who have demonstrated marked proficiency in mathematics the Department offers special courses. In these the topics of Mathematics 21, 22 are covered in a more extensive and rigorous fashion.

Candidates for the special sections must present four units of college preparatory mathematics and SAT verbal and mathematical test scores of 725 or above.

Mathematics 51 (Fall or Spring) *Introduction to Digital Computation*

The first portion of the course deals with the nature of a digital computer, the function of its parts, and the process of programming to solve simple problems. In the second part of the course, the student learns an algorithmic language for presenting problems to computers. This language is similar in form to the English used to state mathematical problems and may be used with many kinds of computers. Each computer translates a problem-solving procedure written in the algorithmic language into its own language and then solves the stated problem. Practical mathematical methods are also developed for the machine solution of problems in certain areas of biology, engineering, mathematics, physics, and social sciences.

The Major in Mathematics

Knowledge of the areas encompassed by mathematics and what this "science" has to offer can be gained from a discussion of its three main branches: algebra, geometry, and analysis. The division known as algebra stemmed from arithmetic and now includes such fields as abstract algebra, group theory, and number theory. The algebra to which students are introduced in high school is a powerful

tool for solving certain types of problems, but it is only one of the many types of algebra. Some of these various abstract algebras have found applications in the physical and social sciences.

The second branch of mathematics, geometry, had its origins in the space apperception of primitive man. The Greeks, combining space concepts with logical and abstract reasoning, developed a postulation or axiomatic system known as the Elements of Euclid. The Arabs added trigonometry to the field of geometry, and the French philosopher Descartes introduced the notion of coordinates, which permitted algebra to enter into the study of geometry. Differential geometry, which arose during the eighteenth century, played an important role in the development of Einstein's theory of general relativity. The first half of the nineteenth century saw the development of several non-Euclidean geometries. The newest subfield of geometry is that of topology. It treats those aspects of figures which do not change under deformation. This newest member of the geometry family came into being at the turn of this century and in the short time since its inception, has engulfed all classical geometries and has had a marked influence in many other areas of mathematics, as well as in such unrelated fields as medicine and psychology.

The third branch of mathematics is called analysis; it was initiated by Leibnitz and Newton towards the end of the seventeenth century. Here a new basic concept in mathematics was added, that of a limit. This has been one of the most fruitful concepts of man; e.g., we use it in rate problems and in finding the volumes of irregular bodies. Many, many developments in chemistry, physics, and other sciences can be traced directly or indirectly to the notion of a limit. A few of the subfields of analysis are calculus, real and complex function theory, differential equations, infinite series, and measure and integration theory.

The student selecting mathematics as a major can concentrate in any one of the three branches just mentioned, or he can select those courses in each branch which appeal to his own particular interests. To these fields should be added the field known as applied mathematics which is playing an increasingly important role in scientific and technological developments. The applied mathematician is interested in the development of mathematics for its own sake as well as in the application of mathematical methods in such fields as engineering, physics, economics, and management. The student interested in applied mathematics should elect courses in analysis, com-

puting, probability, statistics, and mathematical logic. He should also be interested in a related field such as physics or economics.

In the senior year, a major may pursue independent study leading to Graduation with Distinction.

MUSIC

Music 1 (Fall), 2 (Spring), Introduction to Music

Music 1-2 is designed for the general student who wishes to investigate the cultural heritage of musical literature. It provides a technique for perceptive listening by using the elements of rhythm, melody, instrumental color, and form as a basis for stylistic and critical analysis of masterpieces of music in all media, with reference to their social and historical functions. No musical skills are prerequisite.

Music 65 (Fall), 66 (Spring), Theory

This course introduces the study sequence leading to a major in music. It deals with (1) the comprehension of those basic melodic, rhythmic and harmonic techniques upon which Western music is based; (2) the application of these techniques in written exercises and short original compositions with emphasis upon both the linear and harmonic aspects; and (3) the sharpening of skills involving ear training, sight singing, and keyboard harmony.

The course is a composite lecture-discussion-laboratory presentation taught by the theory staff. It is by no means limited to music majors but it does presuppose an acquaintance with musical symbols.

Music 47 (Fall), 48 (Spring), Applied Music

Private instruction from artist-teachers is available in voice, piano, organ, and orchestral instruments. A course of study may be continued for four years and should lead the student through the establishment of a secure technical foundation and into a serious study of the interpretation of musical styles and literature. Prospective music majors should begin this work in the freshman year. General students with previous study backgrounds are also welcome in it.

The Major in Music

The study of music is usually approached through one of three different divisions of the field. Each of these may be considered a "specialization," but a balanced knowledge of all three is essential to the training of a fine musician. These branches are (a) musical performance, (b) musical theory and composition, and (c) music history and musicology.

In order to achieve highest competence in *musical performance* a solid background of technical discipline within a specified medium (for example, piano, violin, or flute) is necessary. This discipline can best be established in the early years and should be well developed at the time of college entrance. At whatever stage one decides upon the study of music, however, the acquaintance and technical mastery of an instrument is essential to the development of musical understanding. This should not be postponed.

The study of *musical theory* encompasses a thorough investigation of the styles and technical resources utilized in compositions which represent the continuity of musical development in Western civilization. Those which are still experimental and which may constitute bases for the art of the future are also studied. The student is encouraged to work with this material in original constructions.

Music history and *musicology* are branches of general historical study. The manifestations of a civilization in terms of its culture are as revealing as those of its politics. This field is not restricted to the prospective professional musician. Courses which cut across various historical periods and which consider music within the context of sociological, economic, and geographic milieu are designed for general students.

The Department offers honors work leading to Graduation with Distinction.

NAVAL SCIENCE

Naval Science 101 (Fall) Naval Orientation

This fall course presents an introduction to the organization of the Navy, including the background and usage of naval regulations, customs and courtesies, and shipboard duties. The characteristics, missions, and capabilities of basic types of naval vessels in carrier, air, surface, undersea, and amphibious operations are studied along with naval terminology, deck seamanship, naval formations, and maneuvers.

Naval Science 102 (Spring) Naval History and Seapower

This course considers the role of seapower from the age of galley warfare to the present, with emphasis on the modern period beginning with the rise of Britain as a world power. The impact of seapower on the rise of world powers is considered as well as its role in peace and war. By studying tactics and strategy of the past the student is challenged to interpret the influence of seapower on world history past, present, and future.

Naval Science Studies

The NROTC, through its four-year Naval Science Course, provides an outstanding opportunity for the undergraduate student to be awarded a commission in the Navy or Marine Corps at the same time he receives his baccalaureate degree. NROTC students are eligible to compete for Navy scholarships that provide full tuition, fees, books and \$50 per month retainer pay, plus the opportunity to participate in summer cruises with fleet surface and air units in Atlantic and European waters. Seniors may obtain their private flying license at Navy expense. In addition, the opportunity is available to continue toward a graduate degree prior to reporting for active duty.

Students already accepted in the NROTC, or those contemplating enrollment in the program after arriving on campus, should register for Naval Science 101.

NURSING

(School of Nursing)

Nursing 1 (Fall), 2 (Spring)

Interpersonal Relations In Nursing

This is an introductory course in nursing and is prerequisite to all courses in clinical nursing. The student is introduced to basic concepts of human behavior as related to stages of growth, personality structure, and basic needs within the current situation. Emphasis is placed on learning techniques of observation, communication, and interviewing. Laboratory experiences are provided so that students may learn to apply these concepts and develop their skills of observation and communication.

Program in Nursing

The faculty of the School of Nursing believes that the student who seeks admission to the School comes with the intent to be a professional nurse; therefore, the program is designed to aid in confirming her intention by offering a curriculum balanced in courses from the liberal arts, the sciences, nursing, and carefully planned experiences in a professional milieu.

The freshman year is devoted largely to the study of liberal arts and basic science courses. Introduction to nursing begins with the study of interpersonal relations which is extended throughout the entire program. The sophomore year is initiated by a formal Capping Service and the wearing of the distinctive student nurse uniform.

It is in this second year that the student begins to feel like a nurse, for the focus is on the Fundamentals of Nursing, a course which is integrated with the biological and social sciences courses included in her program.

In both the junior and senior years the emphasis of the program is in learning the theories and mastering their application in carefully selected laboratory assignments in the Duke University Medical Center and other health agencies in Durham. In the junior year the four major nursing specialties, pediatrics, obstetrics, medical and surgical nursing are studied intensively. In the senior year, the student gains a knowledge of psychiatric and public health nursing and in the area of medical-surgical nursing there is the focus on learning principles of administration, teaching, and supervision of members of the nursing team.

This basic program in nursing is designed to prepare its graduates as professional nurses for beginning positions in nursing as well as to provide the foundation for masters' programs. The graduates of the basic program are eligible to write the examinations for licensure administered by the North Carolina Board of Nursing.

PHILOSOPHY

Philosophy 41 (Fall), 42 (Spring)

Knowledge, Fact, and Value

These courses provide an introduction to philosophy through the study of its main problems. Philosophy 41 studies the problems that arise when one thinks seriously about the nature of reality and his knowledge of it. Philosophy 42 deals critically with the problems arising when one thinks seriously about values, and in particular, about moral and political values.

Both of these courses usually involve a certain amount of reading in the philosophical classics. Although neither course is standardized, a student in Philosophy 41 might find himself reading from the works of Descartes, Berkeley, Hume and Russell. In Philosophy 42, it might be Plato, Kant and J. S. Mill. No attempt is made at a comprehensive treatment of the history of philosophy. In these courses students with a talent for abstract reasoning tend to do well; others have to work to develop this ability.

Philosophy 41 and Philosophy 42 may be taken in either order, or concurrently.

Philosophy 43 (Fall), 44 (Spring)

Philosophy 43 and 44 are designed as tutorial courses for all freshmen who wish to supplement the regular introductory course. Meeting once every two weeks or so in groups of about four each, students discuss books and articles that accompany but do not duplicate the materials in the introductory philosophy course.

Philosophy 48 (Fall or Spring) Logic

Philosophy 48 deals with the analysis and evaluation of reasoned arguments. It provides a general method for formulating and testing the validity of many different types of argument. The course also aims at making the student sensitive to alternate interpretations that may be put on an argument, and aware of the part played by ambiguity and vagueness.

The student learns to use some of the techniques of modern symbolic logic and gains some sense of what is meant by rigor in formulation and proof, and of the nature of formal sciences.

The Major in Philosophy

Philosophy grows out of a group of questions and issues that are as old as our civilization. Most intelligent persons have pondered them at some times in their lives. What sort of universe do we live in? Is it mental, physical, or both? Does it have some over-all purpose or plan? And what about man? Is there some purpose or meaning in life? Does man have free will or is his behavior determined? The philosopher seeks to answer these questions or, failing that, at least to understand them.

Gradually, there have arisen divisions, or major areas in philosophy, each of which can be studied in some isolation from the others. For example, questions of free will may raise questions about the nature of caused behavior, the nature of motivation, of choosing, of intending, and of thinking. These issues form a separate area which we call philosophy of mind. Again, the question of what our aims and purposes are or should be raises further questions which belong to the discipline we call ethics, which investigates such topics as the nature of moral standards, how they are established and justified, and with the analysis of such concepts as "good," "ought," and "right."

Philosophers in trying to answer these questions have found themselves raising in turn such questions as: How do we establish the truth of what we say? How do we test our beliefs? What constitutes good evidence? What is the difference between knowing

and merely believing? This area in philosophy is called the theory of knowledge or epistemology.

When we offer answers to our questions, or offer the solution of a problem, we try to give reasons for our answers. We try to justify and show the soundness of our conclusions. The study of this activity is logic, a branch of the theory of knowledge. Logic deals among other things with the nature of arguments, the differences between sound and unsound reasoning. Out of it grows the investigation into the ways in which general principles or laws are established in the sciences, which we call inductive logic. Related to this is the study of the ways in which conclusions are established in legal arguments, in art criticism, and in evaluation.

Philosophy is old, inasmuch as philosophers have been working with these problems since the dawn of civilization. And yet philosophy is always new, since succeeding centuries encounter new problems and discover new ways of approaching the old. In the twentieth century, philosophy has discovered a new vantage point from which to examine its problems, that of the study of language, and the relations between language, thought, and the world. Viewed from this new standpoint, many of the traditional issues can be seen clearly in a way that never was possible before. And yet the contemporary emphasis on language, which reaches into nearly every corner of philosophy, gives rise to new and special problems of its own, which are studied in formal logic, semantics, and the philosophy of language.

Here then are a few of the major areas in philosophy. Within them one can find subordinate and related studies such as philosophy of science, philosophy of art, philosophy of law, and philosophy of religion.

This brief sketch cannot do more than suggest the way in which the parts of philosophy grow out of and sometimes discard earlier parts; new issues, new fields develop in philosophy. Philosophy, moreover, is one of the few subjects which studies its own history. Part of the study of philosophy is the history of philosophy, that is, the study of what the great philosophers of the past, Plato, Aristotle, Aquinas, Kant, and Hume, to name a few, had to say on the fundamental issues, and, in fact, which issues they regarded as fundamental. Ancient philosophy is not outmoded because it is ancient any more than ancient art is outmoded.

Philosophy is self-conscious in a way that other disciplines are not. For it seeks a total view of things and in trying to answer its

questions, it turns and investigates its own methods and techniques in giving answers. The philosopher, as it were, is always trying to look over his own shoulder to see what he is doing. In this awkward posture, he advances as best he can against the multitude of problems that beset him, while at the same time wrestling with the question "What is Philosophy?", perhaps the most difficult question of all. It will not then be surprising to learn that philosophy has always been controversial; despite large areas of agreement, there are many issues on which philosophers differ widely.

The major in philosophy offers an opportunity to study most of the areas within the discipline. It does not, in itself, lead directly to any career except teaching. But students planning a career in other areas will often major in philosophy because they wish to avoid specializing too soon, or because they recognize the general value of philosophic study in becoming aware of the methods, assumptions and goals of whatever field one works in, and because philosophy, by stressing this broad vision, contributes to the development of cultured and thoughtful individuals. Knowledge of philosophy has always been considered as necessary for any educated person.

In the senior year, a major may pursue independent study leading to Graduation with Distinction.

PHYSICAL EDUCATION

Physical Education (Men) 1 (Fall), 2 (Spring) *Foundation of Physical Education*

In this program an attempt is made to present the "why" and "how" of physical activity to male freshmen. The first two and one half weeks emphasize the presentation of information dealing with cardiorespiratory fitness, training techniques, weight control, body type and body potential, stress and relaxation, and concepts concerning physical activity in modern living. During the next two class meetings, students are given a general orientation to the total program as well as a battery of physical tests.

Following the development of the preliminary test pattern, students are divided into three groups. While the first group is involved in swimming, the second group works in the area of wrestling with emphasis on development of strength, and the third group is involved in a unit on team sports with emphasis on cardio-respiratory fitness development. Each group then rotates with the others so that

all students spend an equal amount of time in each phase of the program during the semester.

The second semester of the freshman year is devoted to large muscle developmental activities including gymnastics, swimming, combatives, track and field; and individual-development students are guided into the area which is best suited to them. A limited choice is given.

Students who are physically limited may take a medically prescribed program of adapted physical education.

Physical Education (Women) 1 (Fall), 2 (Spring), Foundations of Physical Education

Through the required physical education classes, each student becomes aware of her own potentialities and needs in efficient movement; she gains an understanding of the importance of exercise as a part of effective living in adult years; she has the opportunity to improve present skills and to gain the satisfaction that comes from learning new ones; and she has a broader understanding of the place of sports and dance in American culture. This learning takes place during the classwork of the first two years, through election from a wide variety of offerings in the areas of sports, dance, and aquatics, and through reading, discussion, and written tests.

Because of the wide range of physical education abilities among entering freshmen, a series of placement tests is given during Freshman Week followed by individual interviews. Freshmen with specific needs in posture, sport skills, and swimming take special classes during the first half of the semester. Others elect activities such as hockey, tennis, swimming, golf, riding, and modern dance. During the winter activities include bowling, badminton, swimming, fencing, volleyball, basketball, and several types of dance. Courses are divided into beginning, intermediate, and advanced sections, and each student registers in the section which corresponds to her ability.

The Major in Health and Physical Education **(THE WOMAN'S COLLEGE)**

Physical education in some form is universal. It is inherently interesting to children of all ages and to most adults. It is a broad field covering many aspects of motor activity, such as sports, aquatics, gymnastics, the many forms of dance, and recreational activities.

To assure that positive good may result from programs of physical education, trained leaders are necessary. The major program in

physical education in the Woman's College has as its purpose the developing of teachers whose understanding of human needs and behavior and whose knowledge of basic theory as well as skill in performance make them worthy leaders of youth.

The courses in the major program fall into three main categories: principles, methods and materials, and biological science. In studying the history and principles of physical education, the student discovers the part that physical education has played from the early Greek civilizations to the present time. She learns the place of sports, dance, aquatics, and gymnastics in American and European cultures of today. She studies the activity needs and interests of children of different ages and becomes familiar with the laws of learning as applied to the learning of movement skills. Problems of administration in school physical education, program planning, health, and safety are some of the topics studied in other theory courses.

The courses in methods and materials are directed primarily to the teaching of physical education in secondary schools, although teachers of other subjects or students in sociology and religious education find certain of these courses valuable as related work.

A strong background of biological science is also necessary for the major. A course in mammalian anatomy gives students an understanding of all the organ systems and emphasizes particularly the nervous, muscular, and skeletal systems of the human body. In kinesiology human movement is studied. Students review the mechanical principles which apply to human motion and discover the characteristics of movement essential to development of skill and conservation of energy. Physiology is included in order that students may understand the body functions as a basis for healthful living, and may engage in or lead activity with awareness of the effects of exercise on the human mechanism.

In addition, the major needs a broad general education. Courses in written and spoken English, literature, art, music, psychology, and sociology are especially desirable. The broader her educational background and her understanding of people, the more valuable she becomes as a leader and teacher.

PHYSICS

*Physics 1 (Fall), 2 (Spring), Introductory Physics
Physics 41 (Fall), 42 (Spring), General Physics*

The Department of Physics offers two different courses at the introductory level. These courses are of comparable scope and both

are open to freshmen. Physics 1-2 is primarily for those students who do not intend to major in science. A good preparation in algebra is required, but not necessarily in trigonometry. Physics 41-42 is designed for science majors, engineers, pre-medical students, and others who wish to elect it. Introductory Calculus must be taken prior to or concurrently with Physics 41-42.

In scope the introductory courses include the study of mechanics, heat, optics, acoustics, electricity and magnetism, and atomic and nuclear physics. As examples, the concepts dealt with in two of these fields can profitably be given in more detail. In mechanics one considers such things as forces and accelerated motion, mechanical energy, and the conservation laws for momentum and energy, rotational and planetary motion, oscillatory motion, and gravitation. Again, in electricity and magnetism, which are taken up together because of their close relationship to one another, the properties of electric and magnetic fields produced by stationary and moving charges, the forces on electric charges in electric fields and on currents in magnetic fields, and direct and alternating current circuits are studied.

The Major in Physics

Physics has been recognized more and more as one of the most absorbing subjects in the natural sciences. Many of the most important discoveries in this century have been in the field of physics. In the last decade for instance, the study of elementary particles and the invention of the MASER have had far reaching effects on our basic knowledge of matter. The study of semiconductors that led to the invention of the transistor has greatly increased our insight into the nature of crystalline solids and has also resulted in a breakthrough for the electronics industry. The rapid development of physics in the last decade has shown the need for more physicists in basic physics, in applied physics, and in the teaching profession.

The Department offers a full program for a major. The sequence of courses is usually introductory physics, intermediate mechanics and electricity, electronics, kinetic theory of gases and thermodynamics, advanced laboratory, electromagnetic theory and physical optics, and atomic and nuclear physics. The undergraduate does not specialize in a given field of physics, but receives an extensive training in the several basic areas. This prepares him for graduate work in physics or work in other sciences and in engineering.

Senior majors who have demonstrated their ability in course work and in the laboratory can pursue independent research and study in a program leading toward Graduation with Distinction. At all levels there exists the opportunity to become aware of the nature of the research being carried out in the fields of nuclear physics, particle physics, the study of the structure of molecules and solids using both microwave and optical techniques, the properties of matter at temperatures approaching absolute zero, and theoretical physics.

Physics majors usually "minor" in mathematics, and are also expected to take a course in college chemistry, with a recommendation that additional work in chemistry be taken. As a whole, the work elected by the undergraduate major provides a desirably broad liberal arts base. This background is especially important for the person planning to become a professional physicist since he will soon become specialized.

POLITICAL SCIENCE

Political Science 11 (Fall), 12 (Spring)

American and European Political Systems

Political Science 11-12 provides an introduction to the principles and practices of modern government, especially those of the United States, Great Britain, France, and the Soviet Union. The first semester, devoted largely to American government, considers such topics as: constitutionalism and the ways of restricting political power; means of achieving effective relationships between the President and the Congress; ways of making bureaucracy responsive and responsible; the influences of parties and pressure groups; federalism in theory and practice; the judicial function, with special attention to U. S. Supreme Court decisions involving freedom of speech, freedom of religion, equal protection of the laws and related issues of personal liberty; and a selected number of issues in the arena of domestic and foreign policy. The second semester is concerned primarily with European governments and seeks not merely to describe their institutional structure and political practice, but to contrast one with the other and all with the American form of government. The purpose of these comparisons is to delineate the essential characteristics of constitutionalism (whether of the presidential or parliamentary form) and of totalitarianism.

Political Science 11x (Fall), 12x (Spring)

These sections are open to freshmen who have high SAT verbal scores and whose academic record and special interest in the subject matter of the course give promise of superior performance. The sections are limited in enrollment, emphasize class discussion, and concentrate upon a more intensive examination of a selected number of contemporary political problems and issues.

Political Science 43 (Fall), 44 (Spring)

Political Science 43 and 44 are designed as tutorial courses for all freshmen who wish to supplement the regular introductory course. Meeting once every week or two in groups of about four to twelve each, students discuss books and articles that accompany but do not duplicate the materials in the introductory political science course.

The Major in Political Science

The Department of Political Science seeks to convey an understanding of the philosophies, practices, and problems of government and politics. Political science is concerned with the perennial effort to reconcile the claims of justice and power, liberty and authority. In pursuing this broad objective a variety of materials and approaches are used: historical, legal, institutional, philosophical and empirical. As a consequence, political science is a broadly-based social science, one sharing the aims of a liberal arts education as well as one evoking concern for an understanding of the public policy problems of our time. Although of benefit to those students seeking a broad, liberal education, the study of political science is likely to be of special usefulness to those interested in a career in law, business, journalism, teaching, government employment, and public relations.

The student majoring in political science begins with a course in American and European Political Systems. Although it is desirable for the student to elect course work in each of the three broad areas described below, he is given maximum opportunity to develop a departmental program suited to his own needs and interests.

In the area of *Political Theory and Comparative Government* courses are offered in political philosophy from Plato to modern times and in the governments of Europe, Asia, Africa, Latin America, and the Middle East. In the field of *American Government and Public Administration* attention is focused upon problems of constitutional law, civil liberties, the bureaucracy, governmental planning, metro-

politan areas, and state government. Also emphasized are the less formal aspects of political activity, including political parties, voting behavior, pressure groups, and the process of decision-making. In the area of *International Law and Relations* the student may select from among courses concerned with international politics, organization, and law.

In all three areas attention is given to problems relevant to contemporary concerns, such as a comparison of democratic and totalitarian theories and practices, the politics of mature and underdeveloped nations, the relationships among various levels of government, controversial public policies in the domestic and foreign areas, the meaning of liberty, and the relationships of law and power both domestically and in the international arena.

A senior seminar open to qualified majors leads to the preparation of an honors thesis and to Graduation with Distinction.

PSYCHOLOGY

Psychology 91 (Spring) Introductory Psychology

Psychology is the field of study which seeks by scientific methods to describe, understand, and predict the behavior of living organisms. Psychology 91 attempts to give the student an overview of that science. The course content includes such diverse areas as the nature of scientific method; experimentation and qualification as applied to the study of behavior; intelligence and the factors influencing it; the basis for learning, perception, sensation, and motivation; the nature of personality—its manifestations and origins; and social and abnormal behavior. Considerable attention is given to the experimental literature and its relevance to the development of a theory of behavior.

The Major in Psychology

Over the last half century the field of psychology has undergone an enormous expansion, stimulated in large measure by the demonstrated practical value of psychology in a variety of areas of application. Intelligence testing, human engineering, public opinion polling, career counseling, motivational research, market surveys, and clinical interviewing all depend to some extent upon basic psychological knowledge.

Although these applications of psychology are important and interesting, it must be recognized that they *are* applications, that is, they draw upon the essential substance of psychology discovered in

studies of general experimental psychology. Because of the widespread availability in the popular press of information on applied psychology, many beginning students do not have this idea, and are surprised when they discover in the introductory course that psychology does not deal primarily with applications to industry, mental health, academic adjustment, or with occult phenomena, but rather with a set of general scientific principles and the methods by which these principles are established.

In keeping with the importance of general experimental psychology, the psychology major at Duke University is designed to make sure that a student becomes acquainted with this basic field. This emphasis begins in the introductory course. In Introductory Psychology, he studies a series of standard topics which provide him with a survey of the materials which later courses cover in more detail. A student who enjoys the beginning course will probably find the major in psychology exciting.

Beyond the introductory course the student who majors in psychology is required to complete seven semester courses in psychology, including a one semester course in statistics. The courses not covered by specific requirements may be selected from such offerings as biological psychology, child psychology, tests and measurements, applied psychology, and social psychology.

For the major student who is interested and capable, the Psychology Department offers several opportunities for intensive contacts with faculty members. Certain intermediate-level courses entail the completion of a project, which involves experimental work. At more advanced levels a flexible tutorial program (featuring small group discussions) is available. Finally, there are two series of courses which allow the student to do independent study and research. One of these sequences leads to Graduation with Distinction in psychology.

RELIGION

Religion 1 (Fall), 2 (Spring), The English Bible

Religion 1-2 is a comprehensive study of the Bible, including the reading and discussion of the most important parts of the Old and New Testaments. Study of the biblical texts themselves is the primary emphasis of the course, but this enterprise requires considerable reading of selected works of biblical scholarships. Some classes employ short analytical essays and occasional research papers as aids to learning. The complexity of biblical materials and the

great mass of significant scholarship in the field make this course a demanding and stimulating one.

Inasmuch as the Bible contains the primary literatures of the basic religious traditions of the West, this course, conceived as a humanities study, is of indispensable significance for a liberal education. A major aim of the course is to help a student, through a creative apprehension of the past, to become aware of the crucial role played by biblical religion in the development of Western thought.

The Bible is studied in the light of its origins in the history and religion of biblical times. While each professor emphasizes to some degree his special interests and enthusiasms, he is sensitive to the varied religious backgrounds of his students and attempts to present the Bible in the best scholarly traditions of historical, critical, and phenomenological analysis. A major goal of the course is to make intelligible in the present something that has been significant in the past to discover whether it has continuing relevance.

Religion 1x (Fall), 2x (Spring)

These advanced sections are intended to attract students of high verbal ability who have some personal interest in biblical studies and who would welcome a course in which student initiative plays a greater role than is usually the case. These special sections are limited in size and give more opportunity for active discussion and participation by students. Individual study is encouraged in order that students may pursue their particular interests.

Religion 43 (Fall), 44 (Spring), Tutorial

An optional tutorial is offered to freshmen enrolled in Religion 1 and 2 as a supplementary study. It will accent independent investigation and a close working relationship between the professor and student.

The Major in Religion

The Department of Religion represents a program of studies which is considered integral to a liberal education. While the existence of a vigorous and distinctive program of studies in religion at Duke is largely to be explained historically by the relationship of the university to the Church, the present emphasis is upon the study of religion as an element of liberal culture and as one of the humanities. A clear distinction is made between the study of religion (the role of the Department of Religion) and the practice of it (the role of the Chapel and other campus ministries). Recognizing that

confusion at this point has contributed to a situation that has driven the study of religion from the curriculum of many American universities and isolated the practice of religion from the main stream of university life, the Department is committed to historical, critical, and phenomenological methods of study which sustain its role as one of the humanities.

Studies in religion, like those in any of the other humanities, develop according to the content of the subject matter, the personality, training, and proclivities of the teacher, and the receptivity of the student. The professor seeks to show with imagination and sensitivity how a particular vision of life or system of thought looks from the inside, and in this process to open for himself and his students new possibilities for the understanding of human life. As in the case of literature, art, music, philosophy, and history, the study of religion lends itself to the possibility that something can be learned for the enlargement of the minds and lives of men.

Since Christianity has been the dominant religious force in Western culture, the first objective of the study of religion is an understanding of this religion. But this leads to the sources, or the primary literatures of the Old and New Testaments. The program of study begins for all students at this point, and expands into five areas of further study: 1) Biblical Studies; 2) History of Religions; 3) Church History; 4) Theology and Ethics; 5) Christianity and Culture. Every major in religion participates through class study or directed readings and examinations in all of these areas, though he also emphasizes his special interest in one field.

A major in religion is a live option for students whose vocational aim is law, medicine, scholarship and teaching in religion, the various ministries of the Church, and many types of governmental and social service. It is also an intelligent major for a student, not yet vocationally committed, whose concern in selecting a major is to assure a liberal education in the humanities tradition.

The program of studies in religion is designed to give coherence and structure to the work of majors, while also allowing majors and others maximum opportunity for accelerated study and personal achievement. The following facts are worthy of attention: (1) a 1 s.h. course (Religion 100), designed to help a student explore research techniques, is required of all majors and open to other students; (2) qualified juniors and seniors are encouraged to pursue independent reading with the possibility of earning substantial credit in this manner; (3) well-qualified majors, who aspire to Graduation

with Distinction, are invited to participate in an independent study program beginning normally in the junior year; and (4) Senior Seminars, dealing intensively with a selected topic, are open to all qualified students.

ROMANCE LANGUAGES

French 1 (Fall), 2 (Spring), Elementary French

Spanish 1 (Fall), 2 (Spring), Elementary Spanish

French 1-2 and Spanish 1-2 offer an intensive aural-oral introduction to the language, followed by careful reading of edited texts. In each of these courses the recitation is supplemented by regular laboratory listening sessions.

French 63 (Fall), 64 (Spring), Intermediate French

Spanish 63 (Fall), 64 (Spring), Intermediate Spanish

French (Spanish) 63-64 is an integrated course in speaking, reading, and writing. There is a systematic review of the basic grammar and an extended reading program. Frequent listening periods in the laboratory are a regular part of the course.

French 91 (Fall), 92 (Spring), Introduction to French Literature

Spanish 91 (Fall), 92 (Spring)

Introduction to Spanish Literature

French (Spanish) 91, 92 is designed to acquaint the student with the great personalities and the dominant styles and modes of thought which constitute the literary tradition of each country. The student utilizes as an instrument of literary study the language skills which he has acquired in basic courses: he reads to comprehend the thought of the writer and to appreciate the qualities of his expression; he hears his teacher explain and comment in French or Spanish on the texts; he is encouraged to express in the language his own understanding of what he has read.

The Major in French or Spanish

When a student elects to concentrate in French or Spanish, he has decided to study at some depth two important aspects of a particular culture: the language and the literature. At Duke, if he majors in one of these Romance languages, several courses in oral or written French or Spanish will extend and strengthen the skills of speaking and reading French or Spanish. He will devote the greater portion of his time and effort to the study of the national

literature. Proficiency in the use of the language skills will therefore provide him with insights and appreciation of the literary works. The French or Spanish major will obtain a complete experience of the literature of his specialty by a judicious choice of courses ranging over the whole field of the literature. It goes without saying that this contact with the literary masterpieces will create appreciation of and sympathy for the people whose literature he is studying.

We believe, however, that the study of a national literature must be made within the perspective of the humanities and history. We therefore try to balance the major program by incorporating into it related study in history, philosophy, fine arts, and other literature.

A man or woman who majors in the humanities is by definition attempting to understand "man" and to prepare himself for an intelligent adjustment to the society of his fellow men. In deciding to concentrate in one or more foreign languages he can work toward this goal and also prepare himself for a possible career in government, industry, foreign commerce, or teaching.

Students majoring in Romance languages will find regular extra-class activities which put the practical knowledge of the languages to use. There are honorary societies and informal supper meetings of language groups where conversation is carried on in French or Spanish. Every year students present a French play. There is a French Corridor and a Spanish Corridor on the campus of the Woman's College, under the direction of resident native French and Spanish women, where the students pledge to use the French or Spanish language exclusively.

An opportunity for the experience of foreign study is offered through the Duke summer study program in Strasbourg, France and Santiago de Compostela, Spain. Students may also take advantage of Junior Year Abroad programs of other colleges and universities.

In the junior and senior years, especially qualified students may pursue independent study leading to Graduation with Distinction.

RUSSIAN

Russian 1 (Fall), 2 (Spring)

Introduction to the Russian Language

This course introduces the structure of the Russian language. The main objective is to familiarize the student with those features of Russian—its inflectional nature and verbal aspects—that are likely to seem strange to one accustomed to speaking English.

Minor difficulties such as pronunciation, stress, and spelling, are given attention along the way. At the end of the course the student should have a reasonably clear idea of the Russian language, he should be able to understand the structure of the everyday expressions he has learned, and he should be able to read simple prose with the aid of a dictionary.

Russian 63 (Fall), 64 (Spring)
Intermediate Russian Language

The chief goals of this course are those of acquiring the basic vocabulary needed to express ideas in Russian, increasing reading speed with the aid of a dictionary, gaining practice in sight reading, and oral practice. The last is especially valuable since it encourages thinking in Russian rather than translating thoughts from English into Russian.

The Major in Russian

Like the more traditional language majors, the major in Russian emphasizes the study of culture, literature, and history as well as language. Both pre- and post-revolutionary Russia are, of course, included in these studies.

Today the reasons why an American should study Russian and the Russian people are more compelling than ever. In recent years the Soviet Union has dramatically and irrevocably emerged as a young, vigorous, and aggressive world power. The need for persons with a command of the Russian language, and with training in some aspect of Soviet life, or the ability to view a recognized discipline against Soviet backgrounds, is widely recognized. Russian is a language in which a critical shortage of experts exists; and the establishment of preferential government grants for those students who pursue graduate studies in Russian attests to this fact.

Moreover, Russian is the mother tongue of over 100 million people. It is also the administrative language of the Soviet Union. Hence, it is an acquired language for another 100 million non-Russian citizens of the USSR and can serve to unlock the world of other groups within the Soviet Union. These peoples include the Slavic minorities such as the Ukrainians and the non-Slavic members like the Georgians and the peoples of Siberia. Russian is the only bridge between the latter groups and the outside world.

In addition to these immediate needs for learning Russian, sight is not lost of the importance of earlier Russian contributions to the

culture of our time. Classical Russian literature of the nineteenth century, with such names as Pushkin, Dostoevsky and Tolstoy, has a place alongside the great periods of flowering of Western and Eastern culture. Other Russian contributions in linguistics, literary theory, and history are just now beginning to be appreciated.

Russian studies present a challenge, but one well worth the effort. While it must be admitted that Russian is a difficult language, none of its difficulties is insurmountable. Of great help is the fact that Russian is an Indo-European language and has formal categories and a basic syntax little different from those of other members of the Indo-European family like Latin and English. As the student of Russian probes more deeply into his field he will also be struck by the similarities between Russian culture and the culture of the Western world, similarities that are often obscured by superficial differences. He will be equally impressed by the often deep differences lying under apparently similar and analogous institutions. It is the mark of the expert to be able to distinguish between them.

The purpose of the Russian major may then be summarized as the development of persons who, as a result of a thorough and scholarly study of the Russian language and Soviet institutions, have the foundation on which to build the further knowledge so necessary to those whose role will be to understand the Russian world and to interpret this world to their own countrymen.

SOCIOLOGY AND ANTHROPOLOGY

Sociology 91 (Fall or Spring)

Introduction to Sociology: Concepts and Procedures

This course emphasizes the basic concepts and procedures used to describe and understand social systems and social processes. The topics covered typically include the following: consensus and conflict within social systems, culture, social change, social interaction, and such major institutional foci as the economic system, the state, the family, and the church. Attention is also given to the various levels of sociological analysis—individual, group, and societal—and their relationship to one another. Conceptual approaches are illustrated and extended by the use of findings from disciplines such as demography, social psychology, organizational studies, human ecology and anthropology. Incoming students ordinarily enroll in Sociology 91 before enrolling in Sociology 92.

Sociology 91x (Fall)

A special section of Sociology 91 is offered for those especially interested in the study of human behavior or those who may consider a major in one of the social sciences. This section is limited to a small number of qualified freshmen selected on the basis of interest and high SAT scores. Candidates considering this section should note their interest on the registration forms.

Sociology 92 (Spring)

Introduction to Sociology: Sociological Studies

This course introduces the student to the procedures of sociological inquiry through examination of selected monographs. Students become acquainted with methods of framing and answering questions about social systems and social change as they critically evaluate studies. Class discussion of monographs deals with questions such as the following: What are the main problems with which the monograph is concerned? What theoretical posture does the study take to explore the problems? What techniques are employed and how efficiently are data used to answer the questions the author raises? Are the author's theories, concepts, and findings compatible with those of other studies on the same topic?

The range of monographs selected is wide; a student may read monographs on topics such as ways of integration by a person of the many roles he plays each day, Negro-white interaction in a Mississippi town, social structure in an Israeli kibbutz, or consequences of the population explosion in Asia.

The Major in Sociology

Sociologists study patterns and processes in the network of human relationships we call society. Their basic subject matter is human interaction occurring at all levels; in small groups, in communities and in large organizations. Whenever people interact with each other or with their environment, there is material for research.

As one of the developing social sciences, sociology is involved not only in delineating human behavior, but with understanding it. Most sociological research is the result of intellectual curiosity, a desire to comprehend the general underlying conditions that produce, maintain, and transform social life. Sociologists seek to develop generalizations and theories from their inquiries into areas such as race relations, community structure, and unconventional behavior.

Along with the other liberal arts, sociology enriches an understanding of man, his cultural patterns, and society.

The Department of Sociology and Anthropology offers a varied program to undergraduates who desire to specialize in the systematic study of human behavior. General courses introduce the student to the scope, concepts, and methods of sociology while preparing him for more specific study in areas such as industrial relationships, the family, urban studies, race relations, mass communications, and demography. Other special areas of study include social stratification, occupations and professions, social psychology, analysis of the life cycle and collective behavior.

The Department provides its majors with opportunities for learning the skills needed for sociological research. Courses are offered in methodology, sociological statistics and sociological theory. Advanced undergraduates will be encouraged to participate actively in one of the research projects of the faculty.

A special section of Sociology 91 is reserved for freshmen. For upperclassmen, there are opportunities for independent study as well as participation in the Graduation with Distinction Program.

The Major in Anthropology

Anthropology is a comparative discipline which studies mankind everywhere, in all aspects of his nature and behavior, and freely draws on other social sciences and biology to arrive at an integrated view. A student choosing anthropology as his major might begin his training by enrolling in introductory courses in sociology and zoology, following them with General and Cultural Anthropology as preparation for more advanced work in anthropology.

The discipline developed originally from a natural-history approach to the comparative study of man, including his physical make-up and his customs. Today anthropologists retain a holistic interest in man but usually work in one of several subdisciplines. Physical anthropologists study the origin and development of man's physical nature and his place in the biological world. Their major emphases are the study of fossils, genetic processes, and contemporary primate species. Psychological anthropologists investigate the individual's mental and emotional characteristics and growth, in cross-cultural perspective and in relation to universal human needs. Archaeologists and prehistorians concern themselves with events and processes of man's unwritten past. Anthropological linguists work with contemporary languages, as well as languages of the past, and also

trace the relationship between language and culture. Social and cultural anthropologists, who form the largest group, determine the principles underlying human social and cultural behavior of all kinds. Contemporary tribal peoples, peasant societies, new nations, religious and other cultural revival movements, even the modern city—all form part of their subject matter.

The demand for well-trained anthropologists is keen. Many kinds of positions are open to anthropologists with universities and museums, and with state, national, and international organizations. Wherever peoples of diverse cultural backgrounds live and work together, the knowledge and skills of anthropologists prove of value.

ZOOLOGY

The introductory course is described earlier under Biology.

The Major in Zoology

Zoology is the division of biology which deals with animals. As such, it shares the pervading atmosphere of excitement that characterizes modern biology. In the past decade the frontiers of biological research have been pushed so far forward that enthusiasts are predicting a “break-through” in biological knowledge comparable to that in atomic energy, with consequences which could be even more far-reaching.

The major in zoology reflects the nature of modern biology and is changed thereby. After the introductory course the student has a relatively free choice of courses appropriate to his interests and career plans. Other than the restriction that he must take one course in each of three areas, morphology, physiology, and genetics, any undergraduate or senior-graduate course in zoology may be counted toward the hours required for the major.

Many of the exciting recent advances in biological knowledge have come from the development of new techniques and the application of biochemistry, physical chemistry, physics, and mathematics to biological investigation. As a result, new areas such as biochemical genetics, biophysics, and molecular biology become largely interdisciplinary. A modern zoologist must obtain both competence and understanding through adequate training in the other sciences. A good major will thus include, *as a minimum*, introductory calculus, a year of physics, and chemistry through organic. Furthermore, a student who wishes to take more advanced courses than these in the

natural sciences and mathematics may substitute up to 6 s.h. of them toward the major.

Students majoring in Zoology and selected interested freshmen are invited to participate in a non-credit seminar program which meets in a faculty member's home. Outstanding scientists are invited to lecture informally to this group in various areas of biology.

Opportunities for interested and qualified undergraduates to assist in staff research are available throughout the Department. In the senior year, majors may pursue independent study leading to Graduation with Distinction.

A SUMMER READING LIST

“Reading maketh a full man.”—Francis Bacon

The college experience is a compound of many factors. Of these none is more important than the reading which the student does. Much of this reading will be done in order to complete assignments, but the wise student will also keep alive his leisure-time reading in books and periodicals which especially interest him. Reading is a habit—one of the most important habits which the individual can acquire. One who has dipped deeply into literature will continue to enrich his life from that inexhaustible source; but he who has never experienced the thrill of stretching his mind around a new idea or a fresh insight encountered in a book will be impoverished in both spirit and intellect more than he can ever realize.

With that in mind, we recommend that you employ a portion of this summer reading significant books. Those listed below have been selected as a sample of the literature of both past and present with which you ought to be acquainted. You will find here prose and poetry, drama and essay, fiction and fact. You will be led to look inwardly to find meaning for your own life, and outwardly to understand the problems of the society in which you live. You will look backward into history, and forward into the years ahead. Always you will be sharing in the experience of those who have put pen to paper to capture what has been meaningful for their lives, and in so doing you will—hopefully—be enabled to discover that which will make *your* life more worthwhile.

Many of these books will be the subject of discussion when you come to the campus. Those marked “Required” will be considered in some depth in the course of Freshman Week, and you will be handicapped if you have not read them. Others will be discussed in dormitory groups as the semester progresses. One of the authors (Reynolds Price) is a member of the Duke faculty; another (Kenneth Boulding) is scheduled to speak on campus during the year. Two or three of the books will be especially valuable in providing background for the annual Symposium to be held in November, which this year will be concerned with the role of the individual in the university and the role of the university in society. You should read the “Required” books, and as many of the others as you are able. Choose wisely according to your interests and time, not limiting

yourself to those subjects or authors with which you are already conversant but using this opportunity to range widely over unfamiliar ground. Nothing else you do between now and the day you come to Duke will do more to prepare you for the college experience which lies ahead of you.

*Required Books**

Boulding, Kenneth E. *The Meaning of the 20th Century*.
(Harper Colophon Books CN67H, \$1.45)

Dürrenmatt, Friedrich. *The Physicists*.
(Grove Press, Evergreen E-380, \$1.75)

Adventures of the Mind (1st series)
(Vintage Books V-109, \$1.45)

*Recommended Books**

Barzun, Jacques. *Teacher in America*.
(Doubleday Anchor Books A25, \$1.25)

Bonhoeffer, Dietrich. *Letters and Papers from Prison*.
(Macmillan 08391, \$1.45)

Bronowski, J. *Science and Human Values*.
(Harper Torchbooks TB505, \$1.25)

Finch, James Kip. *The Story of Engineering*.
(Doubleday Anchor Books A214, \$1.45)

Frankl, Viktor E. *Man's Search for Meaning*.
(Washington Square Press W-642, \$.60)

Harrington, Michael. *The Other America*.
(Penguin S223, \$.95)

Jarrell, Randall. *Selected Poems*.
(Atheneum 66, \$2.75)

Lagerkvist, Pär. *Barabbas*.
(Vintage Books V-134, \$1.25)

McGill, Ralph. *The South and the Southerner*.
(Atlantic-Little Brown LB 43, \$1.95)

O'Neill, Eugene. *A Long Day's Journey Into Night*.
(Yale Y-61, \$1.45)

- Paton, Alan. *Cry the Beloved Country*.
(Scribner Library SL 7, \$1.45)
- Piel, Gerard. *Science in the Cause of Man*.
(Vintage Books V-258, \$1.65)
- Price, Reynolds. *A Long and Happy Life*.
(Avon Books SS8, \$.60)
- Rudolph, Frederick. *The American College and University*.
(Vintage Books V-288, \$2.95)
- Shakespeare, William. *Othello*.
(Any edition; e.g., Penguin AB-10, \$.65)
- Snow, C. P. *The Masters*.
(Scribner Library SL 105, \$1.65)
- Welty, Eudora. *Thirteen Stories*.
(Harvest Books HB89, \$1.65)

*These books are available in most bookstores. However, if you are unable to obtain them locally, you may order them from *The Gothic Bookshop, Box LM, Duke Station, Durham, North Carolina 27706*. Enclose payment with your order and include 15¢ per book to cover cost of postage and handling.



BULLETIN OF DUKE UNIVERSITY

Trinity College/The School of Engineering
Information and Regulations
1967



Annual Bulletins

For *Bulletin of Information for Prospective Students*, apply to The Registrar, Duke University, Durham, N. C.

For *Bulletin of Undergraduate Instruction*, apply to The Registrar, Duke University, Durham, N. C.

For *Bulletin of The College of Engineering*, apply to The Registrar, Duke University, Durham, N. C.

For *Bulletin of The Divinity School*, apply to The Dean of the Divinity School, Duke University, Durham, N. C.

For *Bulletin of The School of Forestry*, apply to The Dean of the School of Forestry, Duke University, Durham, N. C.

For *Bulletin of The Graduate School of Arts and Sciences*, apply to The Dean of the Graduate School, Duke University, Durham, N. C.

For *Bulletin of The School of Law*, apply to The Dean of the School of Law, Duke University, Durham, N. C.

For *Bulletin of The School of Medicine*, apply to The Dean of the School of Medicine, Duke University, Durham, N. C.

For *Bulletin of The School of Nursing*, apply to The Dean of the School of Nursing, Duke University, Durham, N. C.

For *Bulletin of The Summer Session*, apply to The Director of the Summer Session, Duke University, Durham, N. C.

Published by Duke University monthly except in July, August, September, and December. Entered as second-class matter March 25, 1929, at the Post Office of Durham, North Carolina, under the Act of August 24, 1912.

Statement of Ownership, Management, and Circulation

Date of Filing: June, 1966

Title of Publication: Bulletin of Duke University.

Frequency of Issue: 13 per calendar year.

Location of Known Office of Publication: 207 Allen Building, Duke University, Durham, North Carolina.

Location of the Headquarters or General Business Offices of the Publishers: Same.

Name and Address of Publisher: Duke University, Durham, North Carolina.

Name and Address of Editor: Dr. Frank T. de Vyver, Vice Provost, Duke University, Durham, North Carolina.

Name and Address of Managing Editor: Mrs. Sharon Adler, Duke Press, Duke University, Durham, North Carolina.

Owner: Duke University, Durham, North Carolina.

Known Bondholders, Mortgages, and Other Security Holders: None.
(Act of October, 1962: Section 4369. Title 39 U.S. Code)

BULLETIN OF DUKE UNIVERSITY

Information and Regulations

Trinity College
The School of Engineering
1967

Durham, North Carolina 1966

This bulletin is published to bring together information about regulations for students enrolled in Trinity College and the School of Engineering.

The officers of these "colleges" will seek to keep this publication up to date, but reserve the right to alter or supplement these regulations at any time upon such notice to students as the officers deem suitable and within their discretion.

Please retain this bulletin for ready reference during the year.

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Registration

Semester Opening and Registration

Pre-registered students are expected to report to their college each semester by 6 P.M. on Registration Day. Failure to report entails a loss of the registration deposit (\$25.00) and registration in courses.

Identification Cards

Undergraduate students are issued two-part identification cards, which they should carry at all times. The cards are the means of identification for library privileges, student health services, athletic events, and other university functions or services open to them as university students. Students will be expected to present their cards on request to any university official or employee.

The cards are not transferable, and fraudulent use may result in loss of student privileges or suspension. A student should report the loss of this card immediately to his dean. A duplicate will then be issued upon payment to the Bursar of a replacement fee of \$5.00.

Pre-registration

Students pre-register in the fall or spring of the year for the next

semester on the basis of information and advising available to them at that time. Those who pre-register for either semester at a date later than that specified in the calendar of the colleges are subject to a penalty of \$5.00, payable to the Bursar. Students who do not pre-register within an allotted time must be readmitted to their college by application to the Director of Admissions.

Course Changes during the First Week

After pre-registration, course changes may be made on Registration Day or during the first week of classes. New courses may not be elected later than one week after the opening of classes for the semester. A student who wishes to withdraw from a course during the first week of classes should obtain his class card from his instructor and should secure his signature and those of his adviser (if he has selected a major) and dean.

Academic Regulations

Regulations Governing Courses

Normal Course Load

In Trinity College, the normal course program is 14 to 17 semester hours, exclusive of physical education, with the actual number of hours determined by the student's course of study. In the School of Engineering, the normal program is considered 15 to 17 semester hours, again exclusive of physical education.

Since the University is committed to quality work and an education that is not exclusively course-centered, a student should weigh his reasons carefully before deciding to take a number of semester hours exceeding the normal load. A student who has earned less than a "C" average requires his dean's permission to carry 18 or 19 hours, and no student may exceed 19 semester hours, exclusive of physical education, except with permission.

Valid reasons for dropping below the normal course program may be excessive hours required for employment, special demands of independent study programs, or the normal demands of the senior year. In each instance, the student must have the approval of his dean.

Special Student Status. Where unusual circumstances make it wise, and permission of his dean is secured, a student may register on part-time degree (special) status for no more than two courses with a maxi-

imum credit of eight semester hours. For information regarding the reduced fees assessed in this instance, see the *Bulletin of Undergraduate Instruction*.

Auditing Courses

With the consent of the instructor, a student taking a normal load may in addition audit one or more courses. An auditor does not submit class work, take any tests, or receive a grade, but is expected to attend classes throughout the semester. After the first week of classes, a student may not shift from credit to audit basis in a course nor may he in a later semester take for credit a course he has previously audited.

Pass-Fail Option in Courses (Beginning February, 1967)

With the consent of the instructor, a third or fourth year student may choose to be graded on a pass-fail basis in one elective course each semester. A student accepted on this basis completes all the work of the course but receives either a pass (P) or fail (U) grade in lieu of a standard mark. The credit hours earned apply only to the total cumulative average (see p. 9), as do transfer and Advanced Placement credits. For that reason they are weighted as "C's" toward the required senior "C" average. A pass grade may not subsequently be converted to a regular letter grade.

Dropping Courses after the First Week

If a student wishes to withdraw from a course after the initial week, he should confer with his instructor about his course performance and then discuss the situation with an academic dean in his college. Should the student conclude that it is in his best interest to withdraw, he should obtain a class card, the signatures of both the instructor and his adviser (if he has declared a major), and return to his dean for his approval.

A student may drop a course officially within the early weeks of a semester without penalty if he is clearly overloaded. For freshmen this period is extended to the time when six-week advisory grades are received; for upperclassmen it is extended until November 1 for the fall semester and March 1 for the spring. Factors such as illness or poor health and necessary outside work will also be taken into consideration in assessing whether withdrawal without penalty is permissible. A "W" will be entered opposite the course on the record in lieu of a grade in all cases when withdrawal without penalty is approved. After the above dates, withdrawal will ordinarily incur a penalty "F." A course dropped without approval at any time will be assigned an "F." A course that has been dropped must be retaken in its entirety to receive credit.

Declaration of Major

The second semester of the freshman year is the earliest opportunity for a student to declare his major field of concentration and be advised formally by a faculty member from his major department. All students in Trinity College are to choose a major no later than the spring semester of their sophomore year; students in the School of Engineering may defer the decision until midway through their junior year.

Make-up of Examinations and Course Incompletes

When a student is absent from a final examination, he receives an "X" instead of a final grade. It is the student's responsibility to present an acceptable explanation for his absence to his dean within 48 hours after the scheduled time of the examination. Failure to do so causes the "X" to be changed to an "F."

It is the policy of the undergraduate colleges not to permit re-examinations. When a student has been excused from an examination, it is his responsibility to confer with the instructor of the course involved to arrange a make-up. The time of the new examination is set at the discretion of the instructor. An "X" not cleared by the end of the succeeding semester is changed to an "F."

If because of illness or some other emergency a student's work prior to the final examination is incomplete, he may receive an "I" for the course instead of a final grade. It is his responsibility to arrange to complete the work before the close of the succeeding semester, otherwise the "I" is changed to an "F."

Quality Points, Continuation Requirements, and Class Standing

An overall indication of the quality of student performance is provided by assigning quality points per semester hours of a course as follows: A = 4, B = 3, C = 2, D = 1, and F = 0. The Duke Cumulative Average (DCU) is maintained for each student by dividing the number of quality points earned at Duke by the total number of hours carried—not semester hours passed—at Duke. Hours for courses in which an "X" or "I" has been given are included in the total hours carried.

In addition the Total Cumulative Average (TCU) is maintained which includes all work for which credit toward graduation is granted, with two quality points per semester hour assigned to work transferred from other institutions or assigned for advanced placement.

Rank in class and all honors at Duke are determined on the basis of

the Duke cumulative average; however, in Trinity College the total cumulative average is the basis for determining whether continuation and graduation requirements have been met.

Trinity College

In Trinity College a student must achieve at least the following for continuation from

The first to the second year.....	18 s.h. credit and a q.p.r. of 1.30
The second to the third year.....	42 s.h. credit and a q.p.r. of 1.60
The third to the fourth year.....	66 s.h. credit and a q.p.r. of 1.70
The fourth to the fifth year(if needed)	90 s.h. credit and a q.p.r. of 1.80

Freshmen must pass at least six semester hours of work in their first semester, nine semester hours in the second semester, and a total of 18 semester hours in their first year; all other students must pass at least nine semester hours each semester. Physical education credits are excluded in each case.

Senior Class Privileges

Students who have completed 90 or more semester hours of work and have attained a quality point ratio of at least 1.80 are eligible for privileges normally accorded seniors.

Requirements for Graduation

For graduation from Trinity College in addition to completion of an approved curriculum, a student must meet at least the following minimum requirements: the completion of 124 semester hours with 248 quality points and a q.p.r. of 1.90. The student must also maintain at least a "C" (2.00) average for all work taken in the senior year.

School of Engineering

A student matriculating after September 1, 1965, must achieve at least the following for continuation from

The first to the second year.....	18 s.h. credit and a q.p.r. of 1.30
The second to the third year.....	46 s.h. credit and a q.p.r. of 1.60
The third to the fourth year.....	74 s.h. credit and a q.p.r. of 1.70
The fourth to the fifth year (if needed) ..	102 s.h. credit and a q.p.r. of 1.80

Freshmen must also pass at least six semester hours of work in their first semester, three required courses in the second semester, and 18 semester hours in the first year; all other students must pass at least nine

semester hours each semester. Physical education credits are excluded in each case.

Senior Class Privileges

Students who have completed 96 or more semester hours of work including certain specially designated junior courses are eligible for privileges normally accorded seniors.

Requirements for Graduation

For graduation from the School of Engineering in addition to completion of an approved curriculum, a student matriculating after September 1, 1965, must meet at least the following minimum requirements: the completion of 134 semester hours; a cumulative q.p.r. of 1.90; and a q.p.r. of 2.0 in all work, as well as in all engineering work, taken after senior standing is attained.

Credits

Transfer of Credit for Courses Completed Elsewhere

The transfer of credit for a course completed at another college or university to Duke can be arranged if the school is accredited by a regional accrediting association and a grade of "C" or higher has been earned in the course.

No credit is given for courses completed by correspondence, and credit for no more than six semester hours is allowed for extension courses.

It should also be noted that only credit (semester hours) is transferred. A grade is not entered on the Duke record, and graduation-level quality points (2.0) are assigned for record-keeping purposes.

For information on programs for Study Abroad or procedures relating to Advanced Placement credit, see the *Bulletin of Undergraduate Instruction*.

Reciprocal Agreement with the Consolidated University of North Carolina

Students regularly enrolled in Duke University and paying full fees may be admitted to a maximum of two approved courses per semester at the Consolidated University of North Carolina during the regular academic year upon payment of a nominal registration fee of two dollars and of any other special fees regularly required of all students. One such course may be elected per summer session by a student paying full Duke fees. A student who is interested should see his dean.

Residence Requirements

The final four semesters—or the equivalent—of work must be earned in residence except in those instances in which a student has been approved to take his junior year abroad. For engineering students, 30 of these 60 semester hours must be from those normally taken in the senior year. A student who meets this requirement but who still lacks six to eight semester hours in final fulfillment of requirements may take this work in another accredited institution, provided the work is approved by the director of undergraduate studies of his major department and by his dean.

Summer School Credit

A student may pre-register for courses in the Duke Summer Session at the time of the regular pre-registration for the fall semester or at any time prior to the start of either term of the summer session. He is assured a place in a particular course when he has completed his registration by paying the tuition for the course.

A student wishing to elect summer work at another college should obtain its summer catalogue and secure the approval of his academic dean and the appropriate director of undergraduate studies at Duke. Work can be taken at any accredited college or university, or may be taken at an accredited junior college if completed prior to the conclusion of a student's second year at Duke. In general, a student may transfer course credit for only as many hours of work as there are weeks in the summer session where he takes the course(s).

Attendance Regulations

The attendance regulations specifically place the responsibility for class attendance upon the individual student. *He is expected to attend classes regularly and punctually.* A student should recognize that one of the most vital aspects of a residential college experience is attendance in the classroom and that the value of this academic experience cannot be fully measured by testing procedures alone.

Members of the student body are considered to be sufficiently mature to appreciate the necessity of regular attendance, to accept this personal responsibility, and to demonstrate the kind of self-discipline essential for such performance and, conversely, to recognize and accept the consequences of failure to attend. An instructor is privileged to refer to the dean of the appropriate college for suitable action students who in his opinion are causing their work or that of the class to suffer because of absences or latenesses.

Absences from tests and required classes due to illness will be excused when certified by a proper medical official. When ill a student should report to the Student Health Office immediately in advance of any tests. Absences due to authorized representation of the University may be excused. Excuses are issued at a student's college office.

Withdrawal from the Undergraduate Colleges

A student who wishes to withdraw must give official notification to his dean. Withdrawals at student initiative prior to the Christmas recess in the fall term or prior to April 15 in the spring term are coded as voluntary, and a "W" is entered in lieu of a grade for each course. Voluntary withdrawals after these dates are permitted only in the event of emergencies beyond the control of the student.

Leaves of Absence

Leaves of absence may be arranged for students in good standing who have been approved to participate in Study Abroad Programs (see *Bulletin of Undergraduate Instruction*).

Transfer between Duke Colleges

A student may transfer from one Duke undergraduate school or college to another only upon written application and with the approval of the officers of the undergraduate colleges involved. The review of a student's request to transfer will involve consideration of his general academic standing, citizenship record, and relative standing among the group of students applying for transfer. The college to which transfer is sought will give academic counseling to a student as soon as his intention to apply for transfer is known, although no commitment will be implied in doing so. A request to transfer should initiate in the college in which the student is presently enrolled.

Readmission

Applications for readmission are made to the Undergraduate Admissions Office. Such applications are reviewed by officers of the college to which the student applies. They are reviewed on the basis of several criteria including his academic record at Duke and prospects of com-

pleting requirements for graduation; his citizenship record at Duke and evidence of increasing maturity and self-discipline; the degree of success attendant upon the activities in which he has engaged while away from Duke; and, finally, his relative standing among the group of students applying for readmission. Following the evaluation, a recommendation is made by the college officers with regard to readmission. The Admissions Office then notifies the applicant of the action taken.

Nonacademic Regulations

General Conduct

Trinity College and the School of Engineering expect of their students loyal and hearty cooperation in developing and maintaining high standards of conduct as well as of scholarship. General regulations concerning conduct of undergraduate men are outlined in the Student Judicial Code that follows. The student, in accepting admission, indicates his willingness to subscribe to these regulations and the right of the college to require his withdrawal if he fails to abide by them or if his conduct is unsatisfactory in the judgment of the officers of his college.

General oversight of the conduct of students and the administering of discipline are under the supervision of the deans of the colleges. Immediate supervision of freshmen is entrusted to the Dean of Freshmen and of upperclassmen to the Dean of Men; however, through the expressed willingness of the students in the colleges to assume the responsibility of maintaining high standards of morality, their student bodies have become self-governing to a great degree. A Judicial Board, composed of students duly selected by the Men's Student Government Association, exercises the authority granted the students by the officers of their respective colleges to investigate all cases of misconduct, as well as all other cases of violation of proper standards and traditions, and to recommend to college officers penalties based on their findings.

The Judicial Code

The Judicial Code (as revised in April, 1966, and adopted by the Men's Student Government Association) follows:

Students of the undergraduate colleges of Duke University are required to maintain at all times a high standard of private and public behavior on the University campus and within its environs. Any breach of the generally accepted rules of gentlemanly conduct, honor, or decency which directly reflects upon the University, whether or not covered by the following specific regulations, will be subject to appropriate disciplinary action, which may include expulsion. Claims of ignorance of such high standards and commonly accepted rules of conduct or of the following specific regulations will not be accepted as an excuse for their violation.

Section 1. The following actions are deemed to be extremely serious to the well-being of the Duke University Community. These offenses shall be treated accordingly by the judicial organs of the Association. Those found guilty of these offenses shall be liable to expulsion as the maximum penalty.

- A. Cheating or plagiarism
- B. Forgery
- C. Assault and battery
- D. Theft
- E. Violation of women's living quarters
- F. Perjury
- G. Fraud (including falsification of auto registration, meal tickets, library slips, laundry slips, or student identification cards)
- H. Willful and malicious damage of University property or property of others
 - I. Illegal use or possession of firearms and ammunition, or explosives
 - J. Accumulated convictions of any of the offenses listed under Section 2.

Section 2. The following actions are deemed to be serious offenses against the Duke University Community. These offenses shall be treated accordingly by the judicial organs of the Association. Those found guilty of these offenses shall be liable to suspension as the maximum penalty.

- A. Brawling
- B. Drunkenness involving disorderly conduct
- C. Violation of examination procedure
- D. Aiding and participation in any form of mob violence (including rioting)
- E. Gambling

- F. Violation of the freshman car regulation
- G. Possession or use of fireworks
- H. Reckless driving
 - I. Drinking on the University grounds or in its public buildings
- J. Violation of West Campus, East Campus, or Hanes House visiting regulations
- K. Violation of suspended driving status
- L. Lying
- M. Obscenity

Section 3. The following actions are deemed to be less serious offenses against the Duke University Community. These offenses shall be treated accordingly by the judicial organs of the Association. Those found guilty of these offenses shall be liable to disciplinary probation as the maximum penalty.

- A. The display of alcoholic beverages on the University grounds or in its public buildings
- B. Rowdiness
- C. Participation in any form of "quad ball"
- D. Failure to respond to the summons of a court established by the Men's Student Government Association
- E. Running from a campus policeman

Section 4. Penalties which the judicial organs may recommend for the offenses against the University shall include the following which shall be defined as follows:

- A. Expulsion: Immediate dismissal from and denial of readmittance to Duke University.
- B. Suspension: Dismissal from Duke University with the right to be readmitted when the appropriate "College" permits.
- C. Suspended Suspension: Technical suspension from school, with continuation in school contingent on good behavior and satisfactory academic performance. For the following two semesters the person's citizenship and academic records are reviewed, continued good behavior and satisfactory academic performance being the criteria for remaining at Duke University.
- D. Probation: Probation for two semesters and the threat of suspension if again apprehended committing the same offense or one of equal or worse nature. The person's citizenship or academic record, or both, is reviewed for two semesters. An unsatisfactory record may lead to suspension.
- E. Administrative "F": A failing grade assigned in cases of cheating or plagiarism.

- F. Dean's Reprimand or Board Reprimand: Reprimand by the Dean or Board according to the nature of the offense. These penalties will be given in cases where the seriousness of the offense **does** not warrant any of the above penalties.
- G. Suspension of Driving Privileges: Suspension of driving privileges in cases involving motor vehicles.
- H. Fines: Imposition of a fine appropriate to the nature of the offense; conviction of "quad ball" carries a \$5, \$10, or \$15 fine for the first, second, or later offense, respectively, within a single academic year. Conviction of use of fireworks carries a \$25 fine in addition to other penalties which may be imposed. Fines for other convictions may be levied at the discretion of the Board.

Registration and Storage of Guns and Other Firearms

Students bringing firearms to Duke must register them in the Office of the Dean of Men. Ownership and use of firearms must also comply with all local and State laws. Illegal possession or use of firearms at Duke may result in expulsion from the University.

The State of North Carolina requires that all firearms having a barrel length of eighteen inches or less must be registered at the county courthouse. In Durham, this registration is made at the Office of the Clerk of the Superior Court.

All firearms belonging to undergraduates must be stored in the West Campus Security Office; students are not permitted to keep them in their rooms. Instructions for the storage and use of firearms are given at the time of their registration in the Office of the Dean of Men.

Motor Vehicle Regulations

In accordance with the policy of the undergraduate colleges, freshmen are not permitted to own or operate motor vehicles (including motorcycles and motorbikes) at the University. *Violations of this regulation usually result in immediate suspension.* Cars may not be stored in the vicinity or in a nearby town or city for use within Durham or for the purpose of taking trips outside the city limits.

Freshmen in the following categories may be exempted from this regulation after making written application to the Dean of Freshmen and receiving written permission to bring their cars:

- a. Students living with their families in the city of Durham.
- b. Students commuting daily to the University.

Members of the upper classes of Trinity College and the School of Engineering who wish to operate motor vehicles may do so at Duke after registering them at the Traffic Office. Students under 21 years of age must have the written consent of parent or guardian before operating a motor vehicle at Duke. A standard certificate of automobile liability insurance issued by a recognized company and evidencing coverage of at least \$5,000 per person and \$10,000 per accident for personal injury and \$5,000 for property damage is also required. There is a registration fee for resident students of \$30.00 per automobile or \$10.00 per motorcycle, motorbike, or motor scooter for each academic year.

Vehicles must be registered annually at the beginning of the fall semester or, if a vehicle is acquired later, within five days after bringing it to the campus. If there is a change of status which requires that a new registration emblem be displayed or affects the registration fee, a student must re-register his vehicle within five days.

Residential Arrangements and Regulations

Rental Procedures

A \$25.00 room deposit is required before a student may reserve a room. Once he matriculates, the deposit is held for the entire period of his academic enrollment. The deposit is refundable under the conditions described in the chapter "Financial Regulations."

Rooms are normally rented for the academic year; rental payments, however, may be made by the semester. All payments must be made in advance to the Bursar. After the day of registration, room rent will not be refunded except to those students who withdraw involuntarily to enter the Armed Services of the United States.

Occupancy

Rooms within the residence halls may be occupied by freshmen on the first day of Freshman Week and by upperclassmen 48 hours before the day the colleges open. All rooms must be vacated 24 hours after the close of the period of rental, which is the last day of final examinations, except those students who are graduating may stay until after commencement

exercises. A student must remove all personal effects from his room prior to departure.

Room Regulations

Student Possessions in Room

The following items are not permitted in rooms in the residences: (1) Furniture other than that provided in the residence halls by the University unless approved by the Director of Housing. Exceptions are that small radio, phonograph, or television tables are permissible without reference to the Director of Housing. (2) Cooking appliances. (3) Personally owned refrigerators. (Refrigerators may be rented from the University under conditions established by the Director of Housing.)

Care of Rooms and Adjacent Campus Areas

Though limited maid service is available, a student is responsible for the care of his room and furnishings and is required, as a condition of occupancy, to keep his room reasonably clean and orderly. The University reserves the right to enter and to inspect the condition of any student's room.

Nails, screws, tacks, or adhesives should not be used on the walls or woodwork of the residences. The utilities, wiring, locks, or screens should not be altered. No student shall remove University furniture or equipment from his room.

Games which may damage lawns or shrubbery adjacent to residence halls are not permitted.

Guests

Women guests are permitted in the social rooms on Friday, Saturday, and Sunday from noon to 7 P.M. and are permitted on other occasions only by special permission from the Dean of Freshmen or the Dean of Men.

To provide hospitality for overnight men guests, beds or cots may be secured through the Housing Bureau.

Damage Charges

Students must report within five days after moving into a room any earlier damage that has not been repaired in order to be released from financial responsibility. A form used for reporting these damages to the Housing Bureau will be provided at the time of occupancy.

Students will be held responsible for damage that occurs in their rooms

even though they may be absent at the time. Any repair costs will be assessed the occupant(s) of the room. An appeal for reassignment of costs should be made through the Director of Housing to the Court of Appeals.

Room Changes

Room changes may be made when approved by the living group housing chairman, resident, or housemaster and the Supervisor of Residences. No charge will be made for these changes until October 1 for the fall term or until February 16 for the spring term. After these dates, a charge of \$2.00 will be assigned for room changes. An unofficial room change will make the student liable for payment of rent for each room for the period involved.

Vacancies

When a vacancy occurs in a room occupied by two or more students, the remaining occupant(s) will be expected within a week after official notification by the Housing Bureau either to (1) select a roommate or accept a roommate, if available, assigned by the Housing Bureau, (2) move to another room in which a vacancy exists, or (3) arrange to pay the prorated differential cost resulting from the vacancy.

Storage

Within two weeks after room occupancy, all trunks and heavy luggage must be stored in a storage area designated for each residence. Limited facilities are available to students who have pre-registered for the fall semester for storing personal effects over the summer. Non-students or students living off campus cannot store their personal effects in the residence halls. Storage will be limited to trunks and boxed items no larger than the average trunk; each student will be expected to deliver and pick up his belongings. Each item must be well marked with the owner's name and his permanent mailing address. Receipts will be given at the time of delivery and must be shown by a student to remove his items from storage. The University assumes no financial responsibility for damages to or loss of personal property.

Trading and Soliciting

Without written permission from the Dean of Men, no student, tradesman, or salesman may solicit or sell goods or services in the buildings or on the grounds of Duke University. A student who invites or receives an unauthorized salesman, or who uses his room for any commercial purpose, is liable to disciplinary action.

Medical Care

Student Health Service

The Student Health Service is closely related to the teaching hospital of the Duke University Medical Center. This arrangement provides an unusually comprehensive service, available at all times. The cost, for regularly enrolled students, is included in the general fee paid each semester, and in the fees charged each student in the summer session. If students also have insurance providing hospitalization, surgical, or medical benefits, the benefits are applicable to the cost of their medical care.

The Service is under the direction of the University Physician, with the cooperation of the staff. It includes hospitalization in Duke Hospital, as deemed necessary by the hospital staff, but is limited to 30 days per illness; medical and surgical care under the supervision of a senior physician or surgeon; drugs, x-ray work, and ward nursing. Students pay for board while in the hospital. Refraction of eyes and treatment of teeth and of all chronic and pre-existing conditions (such as diseased tonsils, hernias, pilonidal cysts, and other elective surgery, chronic skin conditions, and endocrine disturbances) are not included. The cost of special nursing and any necessary braces and orthopedic appliances must be borne by the student. Blood used for transfusions must either be paid for or replaced.

Accidents or illnesses occurring during vacations or while students are away from the campus are not included in this service. A special com-

mercial policy available only to regularly enrolled Duke students, if desired, furnishes complementary protection. Information will be furnished by the Bursar.

Advisory consultation with a psychiatrist is available at no expense to students through referral either by physicians from the Student Health Service or by the deans of the colleges, but office visits for psychotherapeutic interviews are not included in this service.

When classes are in session, male students may receive ambulant care at the Student Health Office from 7:45 A.M. to 5:30 P.M. week days and 7:45 A.M. to 1 P.M. on Saturdays. During examination periods the office does not open until 9 A.M. Emergency service and the consulting services of specialists in the Hospital and Medical School are always available.

Emergency Treatment for Nonambulatory Students

When a student requires immediate medical attention as a result of an accident or other incident on campus and is unable to go to the Emergency Room of the Medical Center by himself or with assistance, the Campus Security Office, Extension 2444, should be called to request that a University police car come to the scene of the accident. If the patient can be moved, a security officer is authorized to transport him to the Emergency Room.

If medical assistance is needed before moving the patient, a call should be made to the Emergency Room, Extension 2413, to request that the Senior Assistant Resident in Medicine come to the scene of the accident. He will be brought by a campus security officer.

Financial Regulations

Fees and Expenses

Tuition and fees for undergraduates average \$718.50 for each semester of the regular academic year. This includes tuition, laboratory, gymnasium, library, student health, and graduation fees. Information about insured tuition payment plans acceptable to the University may be obtained from the Office of the Bursar. Additional charges will be made for accommodations in residence halls, meals, and for such extras as election of courses in golf or digital computation, the registration of a car, and damages to University property caused by the student.

By majority vote, each residence hall establishes dues to cover the cost of social and other house-sponsored activities. All residents are required to pay house dues.

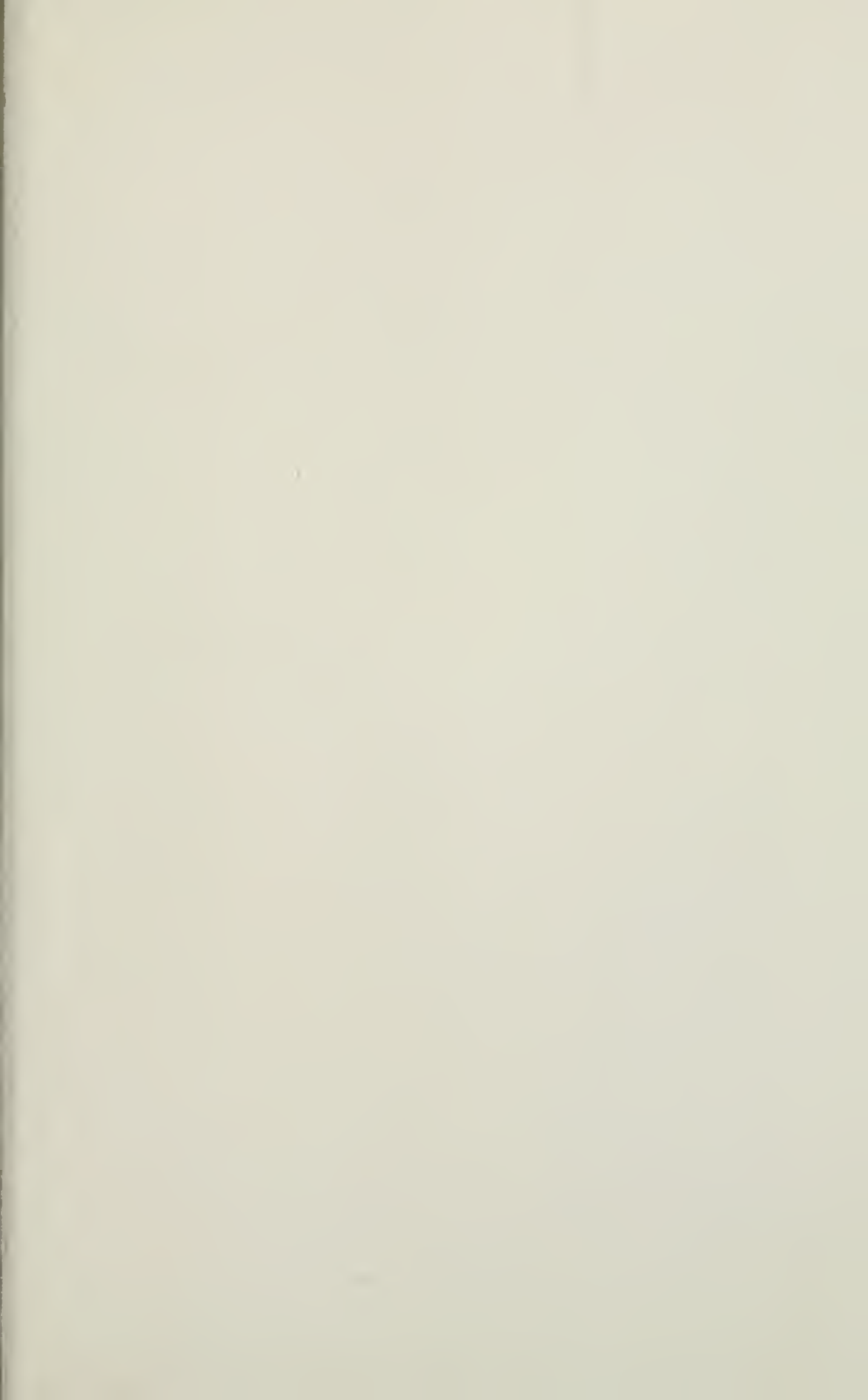
Charges for a year's rental in Kilgo, Craven, Crowell, Few, and Wannamaker Quadrangles are as follows: for a single room, \$380.00; for occupancy in a double room, \$310.00; for occupancy in a triple room, \$285.00. In the new residence halls, charges for a year's rental are: for a single room, \$425.00; for occupancy in a double room, \$355.00 per year.

For matriculated students, \$25.00 of the \$50.00 deposit made at the time of acceptance serves as a continuing room deposit and the remaining \$25.00 as a continuing registration deposit. The \$25.00 registration deposit will be refunded to students (1) whom the University does not

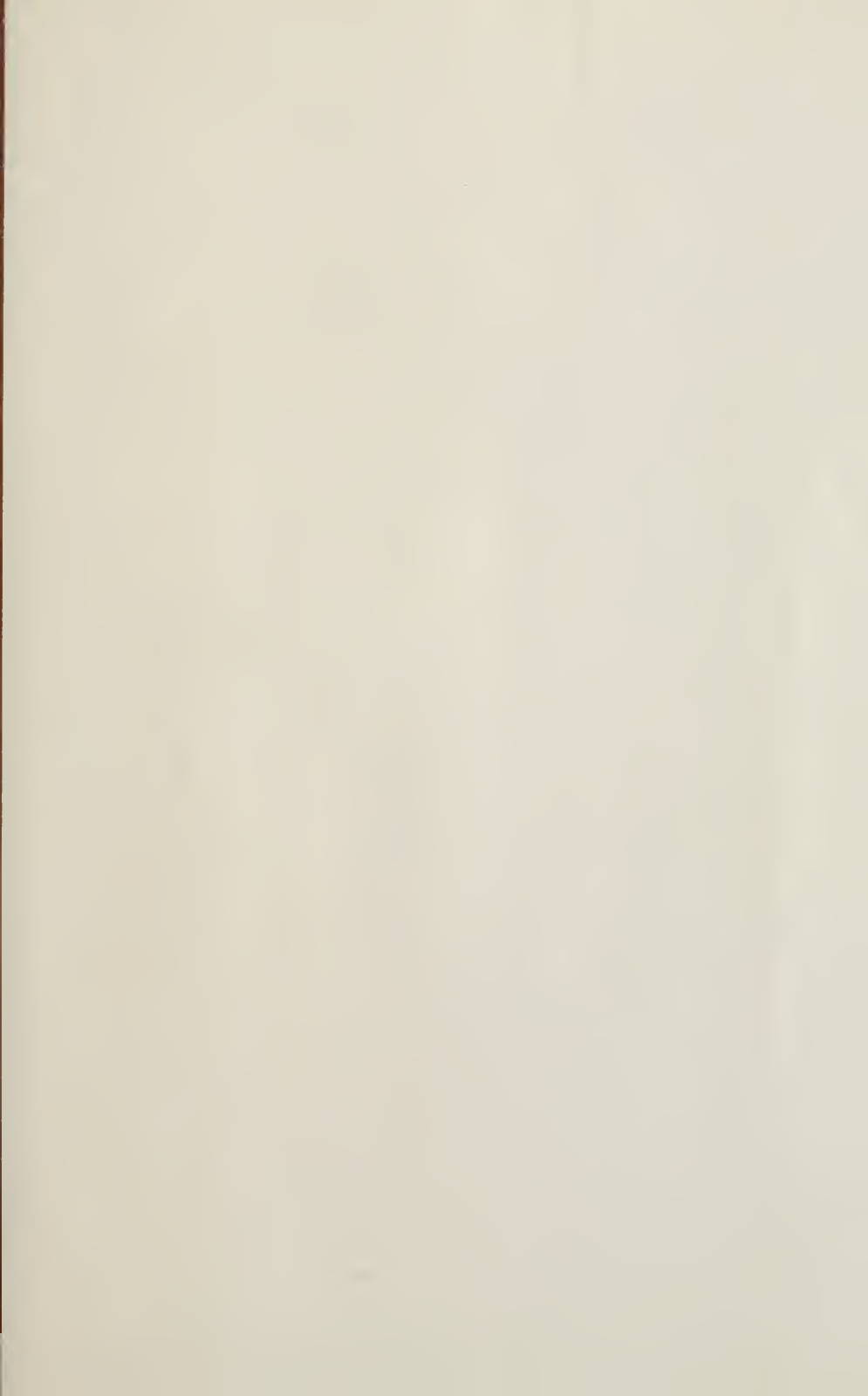
permit to return, (2) who are graduated, or (3) who request the refund at the time of pre-registration, thus indicating their intention not to return for the following semester. The continuing room deposit will be refunded within 30 days after a student's graduation or upon withdrawal from one of the residences by a student enrolled on a semester basis, providing he has given written notice to the Director of Housing before August 1 to cancel a reservation for the fall semester, and not later than January 15 to cancel a reservation for the spring semester. A student will be expected to check out of his room, give the Director of Housing notice that he has done so, and settle his account with the Bursar before the refund is made.

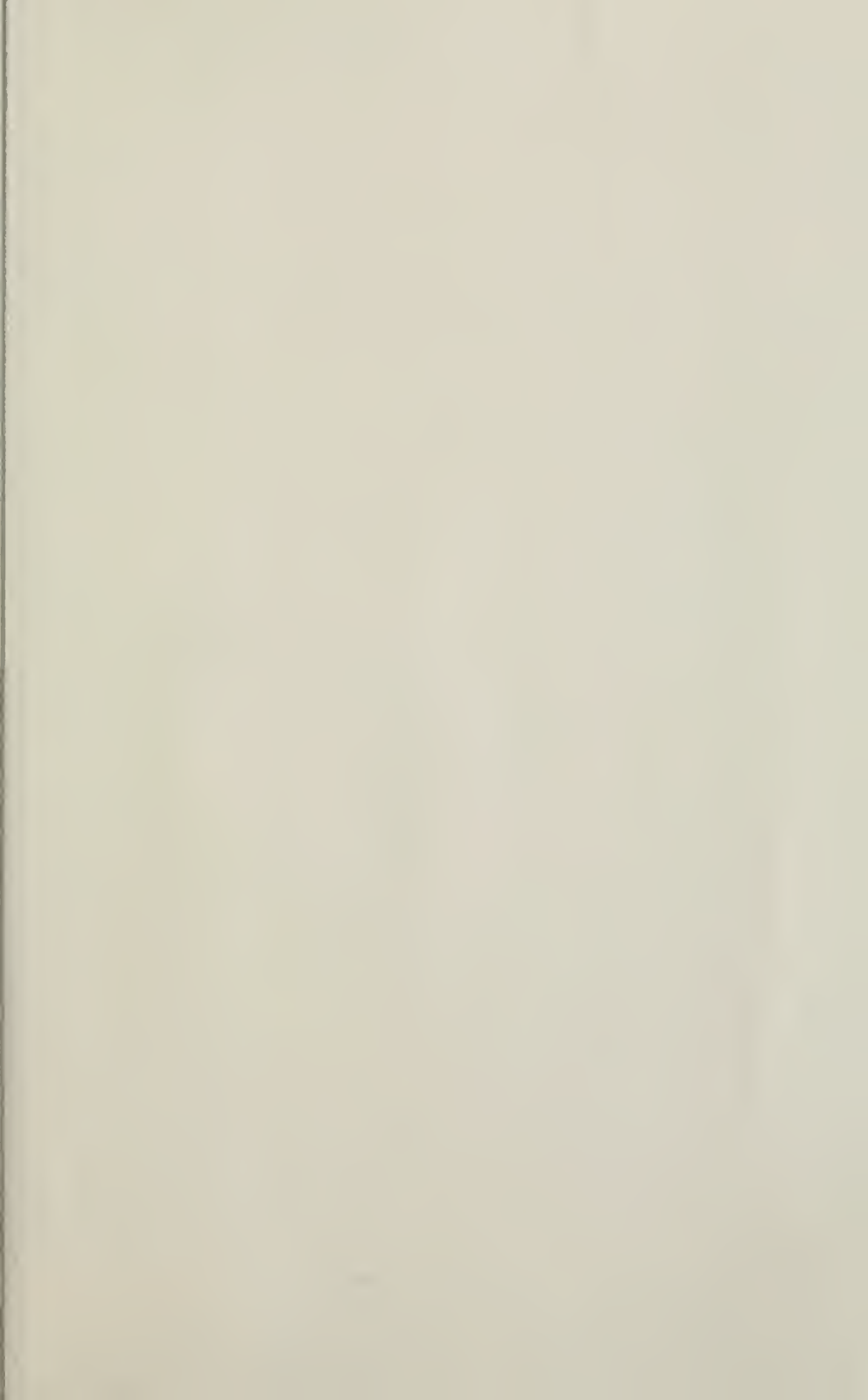
The inclusive fee due each semester is payable to the Bursar not later than the day of registration. Refund of this fee will be made after the day of registration only in cases where a student leaves involuntarily to enter the Armed Services.

Students who register in either semester at a date later than that prescribed in the calendar of the colleges must pay to the Bursar a fee of \$5.00. Changes in courses for reasons of personal convenience incur a fee of \$1.00.













BULLETIN OF DUKE UNIVERSITY

The School of Law

1966

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D3776a
v. 58
no. 6-B

Annual Bulletins

For *Bulletin of Information for Prospective Students*, apply to The Registrar, Duke University, Durham, N. C.

For *Bulletin of Undergraduate Instruction*, apply to The Registrar, Duke University, Durham, N. C.

For *Bulletin of The College of Engineering*, apply to The Registrar, Duke University, Durham, N. C.

For *Bulletin of The Divinity School*, apply to The Dean of the Divinity School, Duke University, Durham, N. C.

For *Bulletin of The School of Forestry*, apply to The Dean of the School of Forestry, Duke University, Durham, N. C.

For *Bulletin of The Graduate School of Arts and Sciences*, apply to The Dean of the Graduate School, Duke University, Durham, N. C.

For *Bulletin of The School of Law*, apply to The Dean of the School of Law, Duke University, Durham, N. C.

For *Bulletin of The School of Medicine*, apply to The Dean of the School of Medicine, Duke University, Durham, N. C.

For *Bulletin of The School of Nursing*, apply to The Dean of the School of Nursing, Duke University, Durham, N. C.

For *Bulletin of The Summer Session*, apply to The Director of the Summer Session, Duke University, Durham, N. C.

Published by Duke University monthly except in July, August, September, and December. Entered as second-class matter March 25, 1929, at the Post Office of Durham, North Carolina, under the Act of August 24, 1912.

Statement of Ownership, Management, and Circulation

Date of Filing: April, 1966.

Title of Publication: Bulletin of Duke University.

Frequency of Issue: 13 per calendar year.

Location of Known Office of Publication: 111 Allen Building, Duke University, Durham, North Carolina.

Location of the Headquarters or General Business Offices of the Publishers: Same.

Name and Address of Publisher: Duke University, Durham, North Carolina.

Name and Address of Editor: Dr. Richard L. Tuthill, Registrar, Duke University, Durham, North Carolina.

Name and Address of Managing Editor: Mrs. Sandra Simmons, Assistant to the Registrar, Duke University, Durham, North Carolina.

Owner: Duke University, Durham, North Carolina.

Known Bondholders, Mortgages, and Other Security Holders: None.
(Act of October, 1962: Section 4369. Title 39 U.S. Code)

BULLETIN OF DUKE UNIVERSITY

The School of Law
1966

Durham, North Carolina 1966

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Calendar of the Law School

1966

September

- 12 Monday—Registration day for first year students
- 13–14 Tuesday–Wednesday—Registration day for second and third year students
- 15 Thursday, 8:00 a.m.—Classes begin

November

- 23 Wednesday, 1:00 p.m.—Thanksgiving holidays begin
- 28 Monday, 8:00 a.m.—Classes resumed

December

- 17 Saturday, 1:00 p.m.—Christmas recess begins

1967

January

- 3 Tuesday, 8:00 a.m.—Classes resumed
- 9–10 Monday–Tuesday—Registration for Spring Semester
- 14 Saturday, 1:00 p.m.—Fall Semester classes end
- 16 Monday—Mid-year examinations begin
- 27 Friday—Mid-year examinations end
- 30 Monday, 8:00 a.m.—Spring Semester classes begin

March

- 25 Saturday, 1:00 p.m.—Spring vacation begins

April

- 3 Monday, 8:00 a.m.—Classes resumed

May

- 17 Wednesday, 1:00 p.m.—Spring Semester classes end
- 18 Thursday—Final examinations begin
- 31 Wednesday—Final examinations end

June

- 3 Saturday—Commencement begins
- 5 Monday—Graduating exercises

Officers of the University Administration

Douglas Maitland Knight, Ph.D., LL.D., Litt.D., L.H.D., *President of the University*

Robert Taylor Cole, Ph.D., *Provost*

Gerhard Chester Henricksen, M.A., C.P.A., *Vice President for Business and Finance Treasurer*

Everett Harold Hopkins, LL.D., *Vice President for Planning and Institutional Studies and Assistant Provost*

Frank Leon Ashmore, A.B., *Vice President for Institutional Advancement*

Charles Edward Jordan, A.B., LL.D., *Vice President for University Relations*

Frank Traver de Vyver, Ph.D., *Vice Provost*

Harold Walter Lewis, Ph.D., *Dean of Arts and Sciences and Vice Provost*

Barnes Woodhall, M.D., *Vice Provost*

Benjamin Edward Powell, Ph.D., *Librarian*

Richard Lovejoy Tuthill, Ed.D., *University Registrar*

Craufurd D. W. Goodwin, Ph.D., *Secretary*

Edwin Constant Bryson, LL.B., *University Counsel*

Law Faculty and Administration

Hans W. Baade, A.B., LL.B., LL.M., Dr.iur., Diplômé de Droit International, *Professor of Law*; *American Editor*, Journal of Business Law.

A.B. 1949, Syracuse University; Dr.iur. 1951, University of Kiel, Germany; LL.B., LL.M. 1955, Duke University; Diplômé 1956, Hague Academy of International Law. Assistant, 1955, and Referent, 1956-1960, Institute of International Law, University of Kiel, Germany; Associate Professor of Law, Duke University, 1960-63; Professor of Law, since 1964.

W. Bryan Bolich A.B., B.A. (Juris.), M.A., B.C.L., *Professor of Law Emeritus*.

A.B. 1917, Duke University; Duke University Law School, 1919-1921; B.A. (Juris.), 1923, B.C.L. 1924, M.A. 1928, Oxford University. General practice, 1924-1927; Member North Carolina House of Representatives, 1927; Legal Attaché American Embassy, Rome, 1950; Visiting Professor of Law, University of North Carolina, Summer 1951, 1955; University of Houston, Spring Semester 1957; Professor of Law, Duke University, 1927-1966; Professor of Law Emeritus, since 1966.

John S. Bradway, A.B., A.M., LL.B., LL.D., *Professor of Law Emeritus*.

A.B. 1911, A.M. 1915, LL.D. 1957, Haverford College; LL.B. 1914, University of Pennsylvania. General practice, 1914-1929; Legal Aid Society of Philadelphia, 1914-1920; Chief Counsel, Philadelphia Legal Aid Bureau, 1920-1922; Secretary, National Association of Legal Aid Organizations, 1923-1940; President, 1940-1942; Visiting Professor of Law and Director of the Legal Aid Clinic, University of Southern California, Summer 1928; Professor of Law and Director of the Legal Aid Clinic, University of Southern California, 1929-1931; Vice-president, N.C. Bar Association, 1945-1946; Visiting Professor, University of North Carolina School of Social Work, 1949-1959. Professor of Law and Director of the Legal Aid Clinic, Duke University, 1931-1959; Professor of Law Emeritus, since 1959.

Edwin C. Bryson, LL.B., *Professor of Law*.

University of North Carolina, 1922-1925; Duke University, 1932-1933; LL.B. 1937, University of Oregon. General practice, 1927-1930. Assistant in Duke University Legal Aid Clinic, 1931-1947; Duke University Counsel since 1945; Associate Professor of Law 1947-1954; Professor of Law, since 1954.

Robinson Oscar Everett, A.B., LL.B., *Professor of Law*; *Co-Editor*, Law and Contemporary Problems

A.B. 1947, LL.B. 1950, Harvard University. Assistant Professor of Law, Duke University, 1950-1951; Military Service, Legal Officer in Air Force, 1951-1953; Com-

missioner of the U.S. Court of Military Appeals, 1953-1955; general practice, since 1955. Visiting Associate Professor of Law, Duke University, since 1956; Adjunct Professor of Law, since 1961.

Argyrios A. Fatouros, Diploma, University of Athens; M.C.L., LL.M., J.S.D., *Visiting Assistant Professor of Law*.

Diploma, University of Athens 1955; M.C.L. 1956, LL.M. 1957, J.S.D. 1962, Columbia University. Research Associate, International Legal Research, Columbia University, 1956-1957; Lecturer, University of Western Ontario, 1960-1962, Assistant Professor of Law 1962-1963; Visiting Assistant Professor of Law, University of Chicago, 1963-1964; Assistant Professor of Law, Indiana University since 1964; Visiting Assistant Professor of Law, Duke University, Spring 1966.

Ernest L. Folk, III, A.B., LL.B., M.A., *Visiting Associate Professor of Law*.

A.B. 1952, Roanoke College; LL.B. 1956, M.A. 1958, University of Virginia. Department of Justice, 1956-1959; Associate Professor, University of South Carolina, 1959-1963; Associate Professor, University of North Carolina since 1963. Corporation Law Review Commission, 1964-1965; Counsel, Joint Commission of S.C. General Assembly to Revise Business Corporation Laws 1961-1963. Visiting Associate Professor of Law, Duke University, Fall 1965.

Ernest Gellhorn, B.A., LL.B., *Associate Professor of Law*

B.A. 1956, LL.B. 1962, University of Minnesota. United States Navy, 1956-1959; General Practice 1962-1966; Associate Professor of Law, since 1966.

Paul Hardin, III, A.B., LL.B., *Professor of Law*.

A.B. 1952, LL.B. 1954, Duke University. General practice, 1954; Military Service, 1954-1956; general practice, 1956-1958; Visiting Professor of Law, University of Texas, Summer 1960, University of Pennsylvania, 1962-1963. Ford Foundation summer research fellowships; Scotland, 1962; Jamaica, 1963; Canada, 1964; Nigeria, 1965. Assistant Professor of Law, Duke University, 1958-1961; Associate Professor of Law, 1961-1963; Professor of Law, since 1963.

Clark C. Havighurst, A.B., J.D., *Associate Professor of Law; Editor, Law and Contemporary Problems*.

A.B. 1955, Princeton University; J.D. 1958, Northwestern University. Military Service, 1958-1960; Research Associate, Small Business Studies, Duke University, 1960-1961; Private Practice, 1961-1964; Associate Professor of Law, Duke University, since 1964.

John D. Johnston, Jr., A.B., LL.B., *Associate Professor of Law and Assistant Dean; Editor, Journal of Legal Education*.

A.B. 1954, LL.B. 1956, Duke University. Private business, 1956-1958; general practice, 1959-1962. Assistant Dean and Assistant Professor of Law, Duke University School of Law, 1962-1964; Associate Professor of Law, since 1965.

Arthur Larson, A.B., M.A., B.C.L., D.C.L., LL.D., L.H.D., *Professor of Law and Director of Rule of Law Research Center*.

A.B. 1931, LL.D. 1953, Augustana College; M.A. (Juris.) 1938; B.C.L. 1957, D.C.L. 1957, Oxford University; Fellow of Pembroke College, Oxford. General Practice, 1935-1939; Assistant Professor of Law, University of Tennessee, 1939-1941; Division Counsel, Office of Price Administration, 1941-1944; Chief, Scandinavian Branch Foreign Economic Administration, 1944-1945; Associate Professor, Cornell Law School, 1945-1948; Professor of Law, Cornell Law School, 1948-1953; Fulbright Fellowship, London School of Economics, 1952; Dean, University of Pittsburgh Law School, 1953-1954; Under Secretary of Labor, 1954-1956; Director, U.S. Information

Agency, 1956-1957; Special Assistant to the President 1957-1958; Special Consultant to the President 1958-1961; Consultant to the President on Foreign Affairs, 1964-; Consultant to the State Department on International Organizations, 1963-. Professor of Law and Director of Rule of Law Research Center, Duke University, since 1958.

Elvin R. Latty, B.S., J.D., J.Sc.D., *Dean and William R. Perkins Professor of Law.*

B.S. 1923, Bowdoin College; J.D. 1930, University of Michigan; J.Sc.D. 1936, Columbia University. Instructor in Romance Languages, University of Vermont, 1923-1927; general practice, 1930-1933; Special Fellow, Columbia University, 1933-1934; Associate Professor of Law, University of Kansas, 1934-1935; Professor of Law, University of Missouri, 1935-1937; Visiting Professor of Law, George Washington University, Summer 1937; Stanford University, Summer 1938; University of North Carolina, Summer 1942, 1947, 1949, 1956; University of Texas, Summer 1951; Fulbright lecturer, University of Pavia, Italy, 1954; Special Assistant to the American Ambassador, Caracas, 1942-1943; Acting Assistant Chief, Foreign Funds Control Division, U.S. Department of State, 1943. Professor of Law, Duke University, since 1937, and Dean of School of Law, since 1958.

Charles H. Livengood, Jr., A.B., LL.B., *Professor of Law.*

A.B. 1931, Duke University; LL.B. 1934, Harvard University. General Practice, 1934-1940; Regional Attorney for the Seventh Region, Wage and Hour Division, U.S. Department of Labor, 1940-1941; Chief of the Wage-Hour Section, Office of the Solicitor of Labor, 1941-1942; Lieutenant Commander, USNR, on active duty, 1942-1945; general practice, 1945-1948; Visiting Professor of Law, University of North Carolina, Summer 1948; George Washington University, Summer 1949, 1956; Fulbright Lecturer, University of Sydney, Australia, 1958-1959. Lecturer in Law, Duke University, 1946-1948; Associate Professor of Law, 1948-1951; Associate Editor, *Journal of Legal Education*, 1951-1952; University Marshal, 1953-1961; Professor of Law, since 1951.

Charles L. B. Lowndes, A.B., LL.B., S.J.D., *James B. Duke Professor of Law.*

A.B. 1923, Georgetown University; LL.B. 1926, S.J.D. 1931, Harvard University. General practice, 1926-1927; Assistant Professor of Law, Georgetown University, 1927-1928; Professor of Law, Georgetown University, 1928-1930; Research Fellow, Harvard Law School, 1930-1931; Professor of Law, Georgetown University, 1931-1934. Professor of Law, Duke University, since 1934. Visiting Professor of Law, University of North Carolina, Summers 1947, 1965; University of Michigan, Summer 1963; University of Florida, 1964-1965.

Malcolm McDermott, A.B., LL.B., *Professor of Law Emeritus.*

A.B. 1910, Princeton University; LL.B. 1913, Harvard University. General practice, 1913-1930; Dean and Professor of Law, University of Tennessee, 1920-1930; Visiting Professor of Law, University of Southern California, Summer, 1929; Legal Consultant, Department of Defense, 1951. Professor of Law, Duke University, 1930-1954; Professor of Law Emeritus, since 1954.

Forest Hodge O'Neal, A.B., LL.B., J.S.D., S.J.D., *Dean-Elect and Professor of Law.*

A.B. 1938, LL.B. 1940, Louisiana State University; J.S.D. 1949, Yale University; S.J.D. 1954, Harvard University. Associate Professor of Law, University of Mississippi 1945-1946; Professor of Law, University of Mississippi, 1946-1947; Acting Dean and Professor of Law, Walter F. George School of Law, Mercer University, 1947-1948; Dean, Walter F. George School of Law, Mercer University, 1948-1956; Professor of Law, Vanderbilt University, 1956-1959; Visiting Professor of Law, New York University, 1957-1958. Professor of Law, Duke University, since 1959.

Joel Francis Paschal, A.B., LL.B., A.M., Ph.D., *Professor of Law.*

A.B. 1935, LL.B. 1938, Wake Forest College; A.M. 1942, Ph.D. 1948, Princeton University. Instructor in Law, Wake Forest College, 1939-1940; USNR, 1942-1946; Instructor, Princeton University, 1946-1947; Research Director, North Carolina Commission for the Improvement of the Administration of Justice, 1947-1949; general practice, 1949-1954; Visiting Professor of Law, Duke University, 1952-1953; Visiting Professor, University of North Carolina, Spring Semester 1956. Associate Professor of Law, Duke University, 1954-1959; Professor of Law, since 1959.

Rufus H. Powell, A.B., LL.B., *Assistant Dean, Student Affairs.*

A.B. 1936, LL.B. 1939, Duke University. General Practice, 1939-1941; Federal Bureau of Investigation, 1941-1965; Assistant Dean, Student Affairs, Duke University, since 1965.

August Kenneth Pye, B.A., LL.B., LL.M., *Professor of Law.*

B.A. 1951, University of Buffalo; LL.B. 1953, LL.M. 1955, Georgetown University. Professor of Law 1955-1966, Associate Dean, 1961-1966, Georgetown University; Professor of Law, Duke University, since 1966.

Melvin G. Shimm, A.B., LL.B., *Professor of Law; Faculty Advisor, Duke Law Journal.*

A.B. 1947, Columbia University; LL.B. 1950, Yale University. 2nd Lt. FA (AUS), 1943-1946; general practice, 1950-1951; Counsel, Wage Stabilization Board, 1951-1952; Bigelow Fellow, University of Chicago Law School, 1951-1953; Visiting Associate Professor of Law, New York University, Summer 1957. Assistant Professor of Law, Duke University, 1953-1956; Associate Professor of Law, 1956-1959; Professor of Law, since 1959; Visiting Professor, University of Southern California, Summer 1965. Faculty, Orientation Program in American Law, Princeton University, Summer 1966. Senior Legal Consultant, The Brookings Institution, since 1965.

Bertel M. Sparks, B.S., LL.B., LL.M., S.J.D., *Visiting Professor of Law.*

B.S. 1938, Eastern Kentucky State College; LL.B. 1948, University of Kentucky; LL.M. 1949, S.J.D. 1955, University of Michigan. Instructor of Law, New York University, 1949-1950, Assistant Professor of Law, 1950-1952, Associate Professor of Law, 1952-1954, Professor since 1954. Visiting Professor of Law, University of Michigan, summer, 1956; Visiting Professor of Law, University of Kentucky, summer, 1957. Special Agent, U.S. Army Counter Intelligence Corps, 1941-1945; Visiting Professor of Law, Duke University, 1966-1967.

Dale F. Stansbury, B.S., LL.B., J.S.D., *Professor of Law Emeritus.*

B.S. 1914, Valparaiso University; LL.B. 1917, Indiana University; J.S.D. 1929, Yale University. Sterling Research Fellow, Yale University, 1928-1929; Deputy Attorney General of Indiana, 1918-1924, 1928; general practice, 1925-1927; Professor of Law, Mercer University, 1929-1935; Dean and Professor of Law, Wake Forest College, 1935-1944; Professor of Law, University of Tennessee, 1944-1946. Professor of Law, Duke University, 1946-1961; Professor of Law Emeritus, since 1961.

John W. Strong, A.B., LL.B., *Visiting Assistant Professor of Law.*

A.B. 1957, Yale University; LL.B. 1962, University of Illinois; General Practice, 1963-1964; Assistant Professor of Law, University of Kansas Law School since 1964; Visiting Professor of Law, Duke University, 1966-1967.

William W. Van Alstyne, B.A., LL.B., *Professor of Law.*

B.A. 1955, University of Southern California; LL.B. 1958, Stanford University; Certificate, Hague Academy of International Law, 1961; California Department of Justice, 1958; United States Department of Justice, 1958-1959; Assistant Professor, Ohio State University College of Law, 1959-1961; Associate Professor, 1961-1964;

Professor, 1964-1965; Visiting Associate Professor of Law at Duke University, spring semester 1964; at U.C.L.A. summer, 1964; Senior Fellow, Yale Law School, 1964-1965; Professor of Law since 1965.

Lawrence G. Wallace, A.B., M.P.A., LL.B., *Associate Professor of Law*.

A.B. 1952, M.P.A. 1954, Syracuse University; LL.B. 1959, Columbia University. U.S. Air Force, 1953-1955; Staff, Maxwell Graduate School, Syracuse University, 1956; general practice, 1959-1960; Law Clerk to Associate Justice Hugo L. Black, U.S. Supreme Court, 1960-1961. Assistant Professor of Law, Duke University, 1961-1963; Associate Professor of Law, since 1964.

Gerald T. Wetherington, A.B., M.A., LL.B., *Visiting Assistant Professor of Law*

A.B. 1959, University of Miami; M.A. 1960, University of Illinois; LL.M. 1963, Duke University. General Practice 1963-1964; Assistant Solicitor, Dade County, Florida 1964-1966. Visiting Assistant Professor of Law, Duke University, 1966-1967.

Visiting Lecturers in Law

Richard E. Blair, B.A., LL.B., LL.M.

David Rabin, A.B., LL.B.

Warren G. Wickersham, A.B., LL.B.

A. Ward McKeithen, A.B., LL.B., *Visiting Instructor*

Research Associates—Rule of Law Research Center

Kazimierz Grzybowski, M.LL., D.LL., S.J.D.

John W. Halderman, A.B., LL.B.

Luke T. Lee, B.A., M.A., LL.B., Ph.D.

Myong-Joon Roe, LL.B., M.C.L.

Edward Yemin, A.B., M.A., LL.B., Doctorat ès sciences politiques

Lucretia B. Duke, *Administrative Assistant*

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Mary Louise Lewis, *Editorial and Research Assistant*

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Irene R. Byrd, *Registrar*

General Information

Law School: Its Purpose and Methods

The official name of the School is the Duke University School of Law, but it will be referred to in these pages as the Duke Law School or the Law School.

The Duke Law School stems historically from the School of Law of Trinity College, with its history of legal instruction running back to the middle of the past century, antedating the Civil War. When, in the 1920's, Trinity College became Duke University, the Law School was completely reorganized. This reorganization culminated with the housing of the Law School on the new West Campus in 1930, when the character of the Duke Law School can be said to have been reshaped.

The curriculum of the Law School provides thorough preparation for the practice of law in any state, and its graduates have been admitted to the bar throughout the nation. Opportunities for specialization in particular branches of the law are afforded.

In carrying out the trust imposed by the indenture establishing the Duke Endowment, the Law School seeks to have the student acquire knowledge and comprehension not only of legal doctrine, but also of the judicial process and of the social, economic, and political problems with which law and lawyers must deal. The method of instruction employed compels analysis of judicial opinions and inquiry into the non-legal as well as the legal considerations which underlie them. In ap-

appropriate courses, special consideration is given to the work of the legislative and administrative agencies of government. In recognition of the increasing importance of the role of the lawyer in representing private interests before government agencies and in government service, a broad program is offered in the public law field. Scope for creative student work is provided by seminar courses and supervised individual study and research.

Practical training is not left for the first years of practice. A carefully integrated series of courses is designed to give students actual experience in the work of lawyers. Legal research, writing courses, moot court work, and practical study of steps in law suits in the first and second years are followed in the third year by seminar courses emphasizing trial techniques, legal planning and drafting, and interdisciplinary approaches. A student bar association affords a means whereby the student may gain acquaintance with the professional organizations through which a lawyer may and should contribute to the well-being of his profession and society.

Courses of Study and Degrees Offered

Bachelor of Laws Degree

Upon favorable recommendation of the Faculty, the degree of Bachelor of Laws will be conferred on students who shall have successfully completed six semesters' study of law, the last two semesters of work immediately preceding the granting of such degree having been completed in this School.

A student shall be deemed to have completed successfully six semesters' study of law if during this period he has completed the following requirements:

- (1) secured a passing grade in courses aggregating 84 semester hours;
- (2) secured in every required course a grade not requiring repetition thereof; and
- (3) secured a weighted average at least five points above passing, whether computed by including or by excluding the grades in the first-year courses.

Students who have spent only their last two semesters of study in residence in this School must have received a weighted average at least five points above passing for that year.

Course Requirements

First Year (Required)

	Semester Hours	
	Fall	Spring
Business Associations I		3
Chattel Transactions	2	
Civil Procedure	3	3
Contracts	3	3
Criminal Law & Procedure	2	2
Property I	2	2
Research & Writing	1	1
Torts	3	2
	16	16

Second and Third Years

In the absence of special authorization by the Dean, each student is required to take in each semester courses aggregating not less than 12 and not more than 16 hours.

The program in the second and third years is entirely elective. In planning his elective program, the student must bear in mind that certain courses are pre-requisites to other advanced courses:

Business Associations II is pre-requisite to the Seminars in Securities Regulation and Corporate Planning and Drafting.

Conflict of Laws is a prerequisite to the Seminar in Conflict of Laws.

Evidence is prerequisite to Trial Practice.

Federal Taxation I is a prerequisite to Federal Taxation II and Federal Taxation III.

Federal Taxation I, Federal Taxation III, and Property II are pre-requisites to the Seminar in Tax and Estate Planning.

Labor Relations is prerequisite to the Seminar in Labor Law.

Trade Regulation is prerequisite to the Seminar in Public Regulation of Business.

Constitutional Law is prerequisite to the Seminar in Civil Liberties and Rights.

Electives and Seminars. The following elective courses and seminars are offered in the second and third years.

Fall Semester	s.h.
Business Associations II (O'Neal & Latty)	2
Comparative Law (not offered 1966-67)	3
Constitutional Law (Van Alstyne & Wallace)	3
Debtors' Estates (Shimm)	3
Equitable Remedies (not offered 1966-67)	2

Evidence (Strong)	3
Family Law (Baade)	2
Federal Taxation I (Lowndes)	3
Federal Taxation II (Lowndes)	3
Insurance (Wetherington)	2
International Law (Baade)	3
Labor Relations (Livengood)	3
Land Use and Development (Johnston)	3
Legal Accounting (not offered 1966-67)	2
Legal History (not offered 1966-67)	3
Legal Process (not offered 1966-67)	3
Military Law (Everett)	2
Mortgages (Wetherington)	2
Municipal Corporations (Everett)	2
North Carolina Practice (Bryson)	2
Patent Law (not offered 1966-67)	1
Property II (Sparks)	3
Sales (Shimm)	3
Seminar in Civil Liberties & Rights (Wallace)	2
Seminar in Criminal Law (Livengood)	2
Seminar in Legislation (Paschal)	2
Trade Regulation (Havighurst)	3
Workmen's Compensation (Larson)	2

Spring Semester

s.h.

Administrative Law (Gellhorn)	3
Admiralty (Wetherington)	3
Business Associations II (O'Neal & Latty)	2
Civil Liberties and Rights (Wallace)	2
Conflict of Laws (Baade)	3
Copyright and Unfair Competition (Wallace)	3
Constitutional Law (Van Alstyne & Wallace)	2
Corporate Planning and Drafting (O'Neal)	2
Federal Jurisdiction (Paschal)	3
Federal Taxation I (Lowndes)	3
Federal Taxation III (Lowndes)	3
International Economic Relations (Baade)	3
International Organizations (not offered 1966-67)	2
Jurisprudence (not offered 1966-67)	2
Legal Profession (Hardin)	1
Negotiable Instruments (Wetherington)	2
North Carolina Statutes (Bryson)	2
Property II (Sparks)	3
Regulated Industries (not offered 1966-67)	2
Securities Regulation (Havighurst)	3

Seminar in Criminal Procedure (Everett)	2
Seminar in Estate Planning (Johnston)	2
Seminar in Labor Law (Livengood)	2
Seminar in Trade Regulations (Havighurst)	2
Seminar in Urban Renewal (Everett)	1
Social Legislation (Livengood)	2
State and Local Taxation (not offered 1966-67)	2
Trial Practice (Hardin & Strong)	2
World Law (Larson)	2

Graduate Study in Law

The graduate program is framed with a view to the encouragement and recognition of legal scholarship. It is designed for the qualified candidate who aspires to a teaching career, or who wishes to become proficient in a special field of the law, to do legal research, to prepare himself for a public-law practice in or out of government, or to pursue studies in subjects he has not explored previously. This program is especially suitable for law teachers and for those who wish to become either law teachers or specialists in the law and who wish to carry on advanced study and original research under faculty supervision, and for foreign law students, teachers, and lawyers who desire to extend their knowledge of the laws of the United States and to engage in comparative legal research.

Three graduate degrees are granted: the degree of Master of Laws (LL.M.), the degree of Master of Comparative Law (M.C.L.), and the degree of Doctor of Juridical Science (S.J.D.).

Master of Laws Degree

The degree of Master of Laws is reserved for students who, having demonstrated their capacity for graduate work in law, maintain a level of scholarship substantially higher than that required for the degree of Bachelor of Laws.

Course Requirements

The candidate for this degree is required to complete a course of study comprising not less than twenty nor more than twenty-six semester hours, or approved research equivalent thereto. Two full semesters are required for the completion of this program. A candidate for this degree is required to include in his course of study at least two courses or seminars selected from those offered in Jurisprudence, in Legal History, and in the international or comparative Law area. Other suitable courses will be selected by the candidate subject to the approval of the Committee on

Graduate Study. In special circumstances, credit of not more than two hours a semester may be given for approved special supervised research projects. In addition to completing twenty semester hours of courses or seminars the candidate must prepare and submit an essay, representing substantial research on a legal subject. This essay is to be prepared under the supervision of the instructor in charge of the field in which the research is done. The candidate will find it helpful to have formulated a project of research, or alternative projects, before his admission to graduate study or, at any rate, before pursuing his graduate study in residence. In appropriate cases, the candidate will be permitted, and may be encouraged, to take related work in other departments of the University.

Master of Comparative Law Degree

The degree of Master of Comparative Law is awarded only to students who maintain a level of scholarship substantially higher than that required for the degree of Bachelor of Laws.

Course Requirements

The candidate for this degree is required to complete a course of study comprising not less than twenty semester-hours. At least two semesters' residence are required for the completion of this program. A candidate for this degree is required to include in his course of study at least two courses from those offered in the world law and comparative law area, and either Jurisprudence or Legal History. Other suitable courses will be selected by the candidate subject to the approval of the Committee on Graduate Study. In special circumstances, credit for not more than two hours a semester may be given for approved, supervised research projects. The candidate is also required to submit an essay representing substantial research on a subject of comparative or international law, written in the English language. This essay is to be prepared under the supervision of the instructor in charge of the field in which the research is done. In appropriate cases, the candidate may be permitted and may be encouraged to take related work in other departments of the University.

Doctor of Juridical Science Degree

Upon recommendation of the faculty, the degree of Doctor of Juridical Science will be conferred on students admitted to candidacy for that degree who complete and submit a monograph or series of essays suitable for publication and deemed by the faculty to be of distinguished character and who pass an oral examination before a special committee appointed for that examination.

Requirements

At least one academic year and, in the absence of an extension granted by the faculty, not more than three years must elapse between the award of the Master's degree and the award of Doctor of Juridical Science. Students who have received the Master's degree from another law school must spend at least two full semesters engaged in research at this School, and in addition may be required to complete a course of study prescribed by the Committee on Graduate Study. The monograph or series of essays required may be based upon, or be an extension of, the essay required for the Master's degree, provided substantial additional research is represented.

Resources for Study

The Law School Building

The new Law School Building was completed and occupied in September, 1962. Located just off the Gothic core of the West (main) Campus, the building is of modified Georgian architecture with contemporary overtones. It reflects a notable characteristic of the School: a high ratio of facilities to students admitted. Despite long-range plans to keep the student body modest in size, the new Law Building in its general spaciousness, number of classrooms and seminar rooms, library reading-room seatings, library stack spaces, student carrels, student lockers, student lounge rooms, faculty offices, quarters for legal publications, special quarters for institutional studies, and courtroom is of proportions ordinarily associated with a far larger student body.

Additional information concerning the Law School and its facilities is contained in the illustrated brochure *Studying Law at Duke*.

The Law Library

The Law Library is one of the large law school collections in the country. It consists of American and English statutory and case law; collections of international, comparative, and foreign law materials; treatises;

digests; encyclopedias; the various selected case series; a comprehensive collection of legal periodicals; and publications in the fields of history, economics, government, and other social sciences, supplemental to the strictly legal materials. The Library receives every current legal periodical of general interest printed in the English language and complete up-to-date legislation of the United States and of every state and territory of the Nation.

There are many thousands of additional volumes of a legal nature in the main University Library Building, as well as the general collection of over a million volumes, to all of which the law students and faculty have convenient access.

The Law Library is administered by a professionally trained staff and is open to the public daily, as well as in the evenings when the Law School is in session.

Rule of Law Research Center

In the fall of 1958, the Duke Law School established its Rule of Law Research Center, with Professor Arthur Larson as its Director.

The purpose of the Center is to undertake both long-range and current studies and publications bearing on the settlement of international disputes and the achievement of peaceful change under law. Typical projects include two recently published books; *Sovereignty Within the Law* and *Propaganda: Toward Disarmament in the War of Words*, and studies of Population Control Laws, and Compliance . . . and Enforcement under International Law. The Center also produces studies and publications in the field of the law of civil rights and race relations. A staff of international lawyers is maintained, together with an undergraduate law student research assistant staff which generally numbers about twelve. The regular staff includes specialists in all the world's major legal systems. Opportunities for course work at the Law School include not only the regular courses in International Law, Comparative Law, International Organizations, and the Law of International Economic Relations, but a unique Seminar in World Law for students particularly interested in this approach to the problem of world order.

Duke University students are also encouraged to combine graduate work with activities of the Center, opportunities for which are made available as far as practicable.

Student Life

Living Accommodations

Housing

The Men's Graduate Center is available to men enrolled in the Law School. Epworth Inn on the Woman's College Campus is available to women enrolled in the Law School.

A resident student, in order to retain his room for the succeeding academic year, must make application at the office of the Housing Bureau for confirmation of the reservation.

The authorities of the University do not assume responsibility for persons selected as roommates. Each student is urged to select his roommate when the room is reserved. Any student who occupies a double room without a roommate will be given written notice from the Housing Bureau to obtain a roommate or he may be required to pay the rental consideration for the whole room.

Any exchange of rooms must be made at the Housing Bureau. Persons exchanging rooms without the approval of the Housing Bureau will be subject to the charges for both rooms.

Duke University Apartments, which consist of efficiency, one-, and two-bedroom apartments, are available to married graduate students. The apartments are complete with basic furnishings. Heat, electricity (except for window fans and air conditioners), hot and cold water, garbage and

trash collection, and maintenance of grounds are all included in the rental charge. For further information on married student apartments, write to the Director of Housing, Duke Station, Durham, North Carolina.

Residence hall rooms and Duke University Apartments may be reserved by new applicants after they have been accepted officially for admission to the School of Law. Applications for residence hall rooms are to be made to the Director of Housing, Duke Station, Durham, North Carolina. For fees and deposit details see pages 21-23.

Food Services

Food service is cafeteria style. The dining facilities on the West Campus include three cafeterias with multiple-choice menus, a grill, and the Oak Room where full meals and *a la carte* items are served. In the Men's Graduate Center there is a cafeteria with multiple-choice menus and a Coffee Lounge where sodas and sandwiches are served from 11:30 a.m. to 11:00 p.m.

Services Available

Medical Care

With exceptions noted below, full medical and surgical care is furnished to all regularly matriculated law students of the University who have paid the semester tuition. This service is under the direction of the physician in charge with the cooperation of the staff of Duke Hospital. It includes hospitalization (limited to thirty days), medical and surgical care, drugs, dressings, x-ray studies, and ward (but not special) nursing. A charge for board is made at the same rate as in the University dining halls. Refraction of eyes and treatment of teeth and of all chronic and pre-existing conditions, such as diseased tonsils, hernia, elective surgery, chronic skin conditions, and endocrine disturbances, or accidents or illnesses occurring during vacations or while off the campus are not included in this service. The cost of any necessary braces and orthopaedic appliances, as well as special nursing, must be borne by the patient. If the student has insurance providing hospitalization, surgical, or medical benefits, the benefits shall be applied to the cost of his medical care.

Placement Service

Duke Law School's placement service is a very active one, in constant touch with leading law firms of the nation, federal and state agencies, corporate legal departments, and other employment opportunities. Special attention is given to placing second year students in summer internships in the summer of the second year.

The Duke Legal Internship Program

In the summer of 1965 the Law School, with the aid of a grant from the National Defender Project, initiated a summer internship program, wherein second and third year law students aided court-appointed defense counsel in the defense of criminal cases. The program, which was organized and directed by Professor Everett, brought the student interns into contact with a variety of problems in the administration of criminal justice as they participated, under the supervision of qualified lawyers, in the investigation of criminal cases, their preparation for trial, and to a limited extent in actual trials. In order to afford the interns an opportunity to acquire a broader perspective, the solicitors (prosecuting attorneys) of Durham and Wake Counties (the two counties in which the program was operating) also allowed the students some opportunity to observe the trial process from the prosecution's standpoint. Guest lecturers and the instructor met with the interns to discuss specific areas of criminal law and procedure and to evaluate their work and discuss their problems. Due to the success of the program in its first year, the National Defender Project has extended the grant, and the program will be enlarged somewhat in length and scope. Moreover, it is being coordinated with several other legal services projects which are now being organized in the region with the cooperation of the Duke Law School as part of the local anti-poverty program.

Employment Opportunities

Although it is not advisable for a law student to undertake any substantial amount of outside work, arrangements have been made to provide part-time employment for capable law students who otherwise would be unable to meet the expense of studying law at Duke.

A number of positions as assistants in the Law Library and as research assistants are open to students, particularly in their second or third years, with some preference being given to those who do not receive other aids from the University.

Professional and Honorary Organizations

The Duke Bar Association

The Duke Bar Association is the student governing organization of the Law School and is organized along the lines of the American Bar Association. Its purpose is to introduce the student to the problems considered by the Bar in professional organizations and to develop professional consciousness and responsibility.

The Duke Bar Association sponsors professional and social activities throughout the year. Dues are \$15.00 per annum, payable in September.

Order of the Coif

A chapter of the Order of the Coif, national legal scholarship society, has been established at Duke University School of Law. Its purpose is "to foster a spirit of careful study and to mark in a fitting manner those who have attained a high grade of scholarship." Election is restricted to the ten per cent of the graduating class who have attained the highest rank in their law school work.

Moot Court Board

A program of student Moot Court arguments is conducted under the supervision of the Moot Court Board as a part of the course in Research and Writing in which all first year students are required to participate. In addition, a team of students is selected each year to represent the Law School in the National Moot Court competition.

International Law Society

Recognizing the importance of the role of law in international affairs, the Duke International Law Society provides a program for examining the application of international law to world problems. Through a series of lecture-discussions in the fall called "A Short Course in International Law" and by featuring distinguished speakers in the field throughout the year, the Society provides its members the opportunity to make contact with the men and ideas that are shaping the development of international law.

Other activities include participation in the annual Philip C. Jessup International Law Moot Court competition, attendance at conferences sponsored by the Association of Student International Law Societies, and entry into various writing contests.

Membership is open to all law students at \$5.00 per annum.

Recreational Facilities

The University is located about two miles from the business district of Durham on wooded hills constituting part of the five-thousand-acre Duke Forest, which is maintained by the School of Forestry. Within a short distance from the campus are facilities for golf, horseback riding, and woodland hiking. Students of the Law School are entitled to the use of the University gymnasium, tennis courts, swimming pool, golf course, and

similar privileges. Other opportunities for physical activity are available through the Intramural Program as well as through such activity groups as the outing club, sailing club, and cycling club. Skiing has been increasingly enjoyed by various groups. Several bowling alleys are available in and near Durham. Motion pictures are shown in Page Auditorium twice a week, and concert programs, recitals, lectures, and plays are presented frequently.

Publications

Law and Contemporary Problems

The School of Law publishes a quarterly, *Law and Contemporary Problems*, edited by Professor Clark C. Havighurst. This periodical, now in its thirty-first volume, presents in each issue a symposium on a problem of current importance, in which the inter-related social and economic, as well as legal, factors are discussed by writers of competence in these respective fields.

The circulation of *Law and Contemporary Problems* extends not only to members of the legal profession and law libraries throughout the country, but also to industrial and financial concerns, governmental agencies, and public and general university libraries. Individual issues are not infrequently used as materials for study in University courses.

Duke Law Journal

American legal education boasts at least one unique institution. Only in America, and only in law, are the scholarly professional journals edited and largely written by students. The *Duke Law Journal* carries forward this proud tradition, which dates from the latter part of the nineteenth century. Articles written by teachers, lawyers, judges, and other scholars are critically evaluated and edited by the board of student editors. Notes and comments concerning recent judicial, legislative, and other developments are written by the students themselves, and edited by their fellow students. Members of the faculty are of course available for advice and consultation. The quarterly issues are widely circulated and become an integral part of the store-house of informal and critical materials to which the profession in all its branches must resort. The student-edited law journal has had a profound influence on the growth and development of the law.

Membership in the *Journal* is the highest honor that can be attained by the student, being reserved for those who not only excel in their courses but also demonstrate capacity to do creative research and writing. Moreover, in the well-nigh universal judgment of the profession, the experience

gained in this work provides the best training that the Law School has to offer. It should be the aim of every qualified student to take advantage of this opportunity.

Corporate Practice Commentator

The *Corporate Practice Commentator*, a quarterly periodical devoted to significant developments and new thinking in the field of corporation law and practice, is edited by Dean-elect F. Hodge O'Neal. Although the *Commentator* is published by a commercial concern, it is assembled and the manuscripts are prepared in the School of Law under the direction of Professor O'Neal. The *Commentator* gives attention to matters of interest and importance to counselors and managers of corporate and other business enterprises. Primary emphasis is placed on corporation law and practice in the narrow sense, but a considerable amount of space is devoted to antitrust questions, labor matters, patents and copyrights, executives' compensation, fair trade legislation, and other matters arising from business activities.

Admission

Beginning students may enter only at the opening of the fall semester in any year. Students who have completed the first year of law study at this or any other law school approved by the Association of American Law Schools may enter at the beginning of any semester.

Procedures for All Applicants

Application must be made on the prescribed Law School application blank which will be sent upon request. A fee of \$10.00 is charged for filing an application. No applicant will be accepted until all required documents are on file. These documents are: (1) the application itself, to which a recently made personal photograph must be attached; (2) a transcript of college record; (3) a report of the applicant's score on the Law School Admission Test, described below; and (4) letters from an official of the college attended and from three or more responsible persons who are acquainted with the applicant's character and general qualifications. *These letters will be requested by the Law School*, and the applicant need only furnish the names and addresses of persons from whom the desired information can be obtained.

Most of our applicants apply at a time when they are still in college, either in the fall or winter of their current college year. We do not ordinarily wait for the completion of the current year's college work before admitting an applicant; normally we take acceptance action on the

basis of a transcript showing college work through the junior year, although we may at times ask for a transcript showing also one semester or term of the senior year. Such acceptance is tentative only and is subject to our final action taken in the light of the further supplemental transcript showing all the college work required for admission to the Law School. (However, it is very rare for an accepted applicant to be rejected later on the basis of his completed transcript.) A good time for a student in college to apply, particularly if he has an outstanding record and wants to make his law school plans early, is in the fall of his final year.

The Law School Admission Test, referred to above, is administered by the Educational Testing Service. It is given four times a year at examination centers conveniently located throughout the United States. No special preparation for the test is suggested, since it is designed to measure aptitudes, abilities, and general background rather than knowledge of subject matter. The applicant's score on the test will be considered along with other data in passing upon his admission to the Law School. Application forms and information concerning the test should be procured by writing directly to the Educational Testing Service, 20 Nassau Street, Princeton, New Jersey.

Requirements for Admission

An application for admission to Duke Law School as a candidate for the degree of Bachelor of Laws may be submitted by any person who is a graduate of a college of approved standing. Applications may also be submitted by a candidate who has completed in a college of approved standing work equivalent in number of units to three-fourths of that required for graduation and whose college work is of outstanding superior quality and in its entirety shows an average grade far above that required for graduation, the requirement in each case being determined by the regulations of the college where the work was taken.

Admission of Students in Combined Course Program

A number of colleges, upon application by their students, have permitted those who have completed three years of undergraduate work to enter the Duke Law School and upon the satisfactory completion of the first year of law school work to receive their Bachelor of Arts degree from such colleges. It is suggested that students desiring to enter Duke Law School under such a program make inquiry of their proper college authorities regarding this point if they meet the applicable requirements for admission. Not over three per cent of an entering class is admitted on this basis.

A student from an undergraduate college of Duke University who has

completed therein three years of study may apply to that college to enroll in a combined course wherein his first year of law study may be accepted toward the Bachelor of Arts degree. Upon the completion of four additional semesters of law study, he will receive the Bachelor of Laws degree.

Students considering entrance before obtaining the Bachelor's degree should consult the rules of the Board of Bar Examiners in the state where they plan to practice law, for regulations applicable to this program.

Admission to Advanced Standing

Any person who has complied with the requirements for admission set forth in this announcement prior to the commencement of his law study, who presents evidence of the satisfactory completion of at least one year of study at any law school which is a member of the Association of American Law Schools, and who is eligible for readmission to the law school from which he proposes to transfer, may be admitted to advanced standing, subject to such rules as would be applicable to students in this School having a comparable scholastic record. Provisional credit for courses so completed will be given, final credit being conditioned on the completion of at least one full year of law study in this School with an average at least five points above the passing grade. Adjustment of credit for work done in such other law schools may be made by the Dean or by vote of the faculty.

Admission of Candidates for Graduate Degrees

Applications for admission to graduate study should be addressed to the Dean of the Law School and should include transcripts of records of legal and prelegal work. For the requirements for the graduate degrees, see pages 6-8.

Master of Laws Degree

Any person who has received the first degree in law from a law school which is a member of the Association of American Law Schools, or from a university in the United Kingdom of Great Britain and Northern Ireland, or in Australia, Canada, Eire, or New Zealand, may be admitted as a candidate for the degree of Master of Laws, provided he satisfies the Committee on Graduate Study that his objective in desiring to do graduate work in law is consistent with the purposes for which the program is offered, and provided he demonstrates to the Committee, on the basis of his record, his capacity to take and profit by graduate work in law. Normally the applicant will be required to show a level of scholarship appreciably higher than that required for the first degree in law at the

institution from which he received that degree. Those applicants who aspire to a teaching career are expected to have had, and are expected to maintain throughout their graduate studies, an exceptionally high academic record.

Master of Comparative Law Degree

Any person (1) who has received the degree of *doctor iuris* or its equivalent from a foreign university, or (2) who, having completed such academic training as is required in his country for the practice of law, has already demonstrated his special qualifications by publications in learned journals or otherwise, and who has the knowledge of and facility in the English language needed to achieve distinction in competitive study at an American university may be admitted as a candidate for the degree of Master of Comparative Law (M.C.L.). The applicant must satisfy the Committee on Graduate Study that his objective in doing graduate work in comparative law is consistent with the purposes for which the program is offered, and he must further demonstrate to the Committee, on the basis of a scholastic record comparable to at least a B average at an American law school of high standing, and by his previous publications, if any, his capacity to profit by graduate work in law. Normally, admission to candidacy for this degree is limited to applicants who intend to study one or more specific fields of American law with a view to utilizing such knowledge upon their return to their respective countries, and who have already done some preparatory work in this direction.

Any person eligible to be admitted as a candidate for the degree of Master of Laws may, upon recommendation of the Committee on Graduate Study, be admitted to candidacy for the degree of Master of Comparative Law.

Doctor of Juridical Science

A person holding the degree of Master of Laws or Master of Comparative Law (or Jurisprudence) from this or any other law school which is a member of the Association of American Law Schools may, on recommendation of the Committee on Graduate Study and favorable vote of the faculty, be admitted to candidacy for the degree of Doctor of Juridical Science (S.J.D.), provided he completed the work for the Master's degree with distinction.

Financial Information

Fees and Expenses

It is estimated that the expenses of a thrifty unmarried student at Duke Law School, aside from tuition, can be kept around \$1,400.00 per academic year.

Tuition

Tuition is due and payable not later than the day of registration for a particular semester. For the academic year 1966-1967, the tuition is \$700.00 a semester. After the final day of registration no refund of the tuition will be made except for involuntary withdrawal to enter the armed forces.

Registration Deposit

Admitted applicants are required to deposit the sum of \$50.00 with the Office of the Bursar. This deposit is nonrefundable, but will be credited to the account of the matriculated student.

Living Accommodations

Housing. The Men's Graduate Center is available to men enrolled in the Law School. The rooms are equipped for two persons and the rental

charge for a double room is \$620.00 for the academic year or \$310.00 for each occupant (\$155.00 per semester for each occupant).

Epworth Inn on the Woman's College Campus is available to women enrolled in the Law School. The rental charge for a single room is \$405.00 for the academic year or \$202.50 for each semester. The rental charge for a double room is \$670.00 for the academic year or \$335.00 for each occupant (\$167.50 per semester for each occupant).

Duke University Apartments, which consist of efficiency, one-, and two-bedroom apartments, are available to married graduate students. The apartments are complete with basic furnishings and the current rental charges per month are \$70.00 for the efficiency, \$90.00 for the one-bedroom, and \$110.00 for the two-bedroom apartments.

Room Deposit. A \$25.00 deposit is required of each applicant before a residence hall room reservation is made. The initial room deposit is effective during the student's residence in the University residence halls if attendance is continuous in regular academic years.

Refund. The deposit will be refunded under the following conditions:

1. Within thirty days after the student has been graduated provided written notice is received at the Housing Bureau requesting refund.
2. Upon withdrawal from Duke University Residence Halls by students enrolled on the semester basis, provided written notice is received by the Director of Housing by August 1st for cancellation of a reservation for the fall semester, and not later than January 15th for cancellation of a reservation for the spring semester.
3. When the reasons requiring withdrawal are beyond the student's control.

No refund will be made until the occupant has checked out of his room through the Housing Bureau and has settled his account with the Bursar.

Rooms are rented for the academic year but for no period of less than one semester without special arrangements. After the day of registration, no refund of room rent will be made except for involuntary withdrawal to enter the armed services. Such refunds will be made in accordance with the University's established schedule. Regulations governing the occupancy of rooms will be supplied by the Director of Housing to those students who make application for housing.

Food Service. Food service is cafeteria style. The cost of meals runs approximately \$1.75 to \$2.50 per day, depending on the need and taste of the individual. The dining facilities on the West Campus include three cafeterias with multiple-choice menus, a grill, and the Oak Room where full meals and *a la carte* items are served.

In the Men's Graduate Center there is a cafeteria with multiple-choice menus and a Coffee Lounge where sodas and sandwiches are served from 11:30 a.m. to 11:00 p.m. The prices in these dining rooms are the same as on the West Campus.

Late Registration Fee

Students who register in any semester at a date later than that prescribed are required to pay to the Office of the Bursar a \$5.00 penalty for late registration.

Athletic Events Fee

Law students may secure admission to all regularly scheduled University athletic contests held on the University grounds during the entire academic year by payment of the athletic fee of \$15.00 per year plus any taxes that may be imposed. (This fee is payable in the fall semester.) They also may use the facilities of the Duke Golf Course upon payment of student green fees.

Motor Vehicle Registration Fee

Each motor vehicle operated on the campuses by students enrolled in the School of Law must be registered at the Traffic Office in the Social Science Building, and a \$30.00 registration fee must be paid at this time.

Financial Aid

Scholarships

Scholarships are available, varying in amount. Except for a few scholarships that are based purely on merit, scholarships are awarded only to needy applicants with markedly superior college records and comparable Law School Admission Test scores. A scholarship may cover all or part of the tuition charge. The more usual form of financial aid is a combination of scholarship and loan. Scholarship grants will be continued to second- and third-year students maintaining a high standard of work.

Loans

To the extent of the funds allocated to Duke University from its participation in the student loan program established under the National Defense Education Act of 1958, loans up to \$2,000 per year (so limited as of the present writing) are available to Duke students. Interest on these loans begins to accrue at three per cent one year after the student leaves the School, and repayment normally begins two years after the student leaves the School, with complete repayment scheduled over a ten-year period. Recent changes in this law have been enacted but the 1958 law continues effective for the time being. The changes will not substantially alter the benefits available to students.

Loans from funds held in trust by the University are also available to qualified law students. Interest on these loans, which mature after the student has left the School, accrues from the date of each note at the rate of one per cent until the student has left the School and for five years thereafter at three per cent per year, with repayment in installments over the five-year period. Loans from these funds are available up to \$1,200 per year, less the amount of any loan made under the paragraph above.

Approval of loan application is based on the financial need, scholastic attainment, and personal integrity of the applicant. Unmarried students with automobiles, who plan to live on campus, must establish a bona fide need for the automobile before a loan application will be approved.

In addition to the loans above mentioned, the School participates in the American Bar Association Loan Fund and United Student Aid Fund programs. These programs provide guaranteed commercial bank loans to needy law students, up to \$1,000 per year. These loans are readily available.

A special fund is also available for law students for small loans to tide over temporary financial emergencies arising during the course of the year.

Registration and Regulations

Registration

All students are required to register on the dates prescribed in the Law School Calendar, at which time class schedules and course cards must be filled out and approved. A student's registration for any semester is not complete until he has settled all indebtedness with the Office of the Bursar. Students who register in any semester at a date later than that prescribed are required to pay to the Office of the Bursar a \$5.00 penalty for late registration.

Academic Regulations

Course Requirements

Minimum and Maximum Student Loads

No regular student is permitted to take less than twelve course hours per semester. No first year student is permitted to take courses in excess of the first year program. Second and third year students are not permitted to take for credit more than sixteen course hours per semester, nor to audit and take for credit more than seventeen course hours per semester.

In exceptional cases, with the consent of the Dean a student may take more or less than the prescribed maximum or minimum loads, but no student shall receive full residence credit if he takes fewer than the ten hours per semester for credit required for approved schools by the American Bar Association.

Scholastic Standards

Eligibility to Continue Law Study. Any student who at the end of his first year or at the end of any subsequent semester has an average grade lower than D on all the work then taken is ineligible to continue his work in the School. Any other student (1) whose average final grade at the end of his first semester is below D, or (2) whose average grade at the end of any subsequent semester on all the work then taken is below C, or (3) who in any single semester or in any single year receives failure grades in courses totaling eight or more semester hours, may at any time be declared by the Dean ineligible to continue.

Notification of Unsatisfactory Scholastic Standing. Every student subject to the provisions of the second sentence of the paragraph above, who has not been declared ineligible to continue his work in the School will be given a formal, written notice by the Dean's Office. This notice will set forth his average grade or grades and inform him (1) that he will be subject for the ensuing year to the special supervision of the Dean, who may order his dismissal from the School in the event of his failure to maintain a satisfactory scholastic standard, and (2) that he will be ineligible to receive a degree unless his work meets the scholastic requirements for graduation, which will be set forth in full in such notice.

Every other student whose average final grade at the end of any semester on the work of that semester, or on all work then taken, does not exceed the minimum average grade required for graduation by more than two points will be given a notice similar to that provided for above.

Attendance Regulation

Regular class attendance is required. The right to take the examinations, as well as the privilege of continuing one's membership in the School at any time, is conditioned upon regular attendance at the exercises of the School.

Nonacademic Regulations

Motor Vehicles

Each motor vehicle operated on the campuses by students enrolled in

the School of Law must be registered at the Traffic Office within 5 days after arrival, and thereafter must display the proper registration emblem. To register a vehicle, the student must pay the prescribed fee of \$30 and present the following documents:

1. State vehicle registration.
2. State operator's license.
3. Evidence of automobile liability insurance as required by North Carolina law: \$5,000 per person and \$10,000 per accident for personal injuries, and \$5,000 property damage.

Parking, Traffic, and Safety Regulations will be given each student registering his vehicle. Students are expected to abide by these regulations.

Conduct of Students

All students are admitted subject to the rules of the University and of the Law School, and continuance in the School is conditioned upon the observance of such rules.

The University expects of its students loyal and hearty cooperation in developing and maintaining high standards of conduct and scholarship. The University, therefore, reserves the right, and matriculation is a concession by the student of this right, to compel the withdrawal of any student whose conduct at any time is not satisfactory to the University.

Registration for Bar Examination

Many states now require that a student, prior to or shortly after beginning of the study of law, register with the board of bar examiners of the state if he intends to practice therein. Each student should ascertain by writing to the secretary of the board of bar examiners of the state in which he plans to practice, or by other channels of information, whether that state makes this requirement.

Descriptions of Courses

Business Courses

Business Associations I. Legal principles concerning association in business by agency, partnership, other unincorporated forms and corporations. Creation, form and nature of agency, partnership and corporation, corporate existence (de facto corporations, corporate entity and its limitations), powers, duties, liabilities and compensation of agents, partners, officers and directors, risks in conduct of business by representatives (vicarious liability in tort, authority to contract), imputation of notice and knowledge, scope of enterprise (ultra vires), revocation and termination of authority, ratification, undisclosed business associates, stability of the associational relationship. The purpose of this course is to grasp basic principles of Agency and Partnership and introductory related principles of corporation law. (The main basic study of corporation law, however, is in Business Associations II.) 3 s.h. (spring). *Latty*

Business Associations II. Promoters, subscription to and issue of shares, stock structure and corporate capital, dividends, preferred stock, bonds, capital increases and reduction, corporate re-acquisition of own stock, elementary principles of corporate accounting, public issue of securities, stock transfers, fundamental corporate changes (recapitalization, sale, merger and consolidation, dissolution), stockholders' suits, and certain principles concerning management and operation not studied in Business Associations I. 2 s.h. each semester. *O'Neal and Latty*

Contracts. The formation and legal operation of contracts, their assignment, significance to third parties, and relationship to torts, restitution; and commercial law developments, the variety, scope, and limitations on remedies, and the policies, jurisprudence, and historical development of promissory liability. 3 s.h. each semester. *Van Alstyne*

Seminar in Corporate Planning and Drafting. The student is given hypothetical corporate problems (perhaps taken from the practicing lawyer's desk) on a client's proposed course of action; each problem is designed to require the student to grasp the business situation and goals involved, analyze for pertinent legal principles, plan the transaction to avoid legal business (including taxation) pitfalls, plan the requisite steps to consummate the desired transaction, draft the appropriate papers and present his research. 2 s.h. (spring). *O'Neal*

Debtors' Estates. Comparative study of methods used for the liquidation of debtors' estates. The nonbankruptcy materials cover individual creditor's rights by attachment, garnishment, execution, creditors' bills and the like; common law compositions and extensions; and general assignments. The bankruptcy materials cover, in the main, the first seven chapters of the Bankruptcy Act. 3 s.h. (fall). *Shimm*

Insurance. The nature of "insurance"; government supervision and control; types of insurance organization; the legal requirement of insurable interest; interests of others than the named insured; the measure of indemnity; subrogation; the beneficiary's interest in life insurance; the insured event and excepted causes; warranties, representations and concealment; the making of insurance contracts; waiver, estoppel and election. 2 s.h. (fall). *Wetherington*

International Economic Relations. See Public Law Courses, page oo, for description.

Legal Accounting. An examination and analysis of accounting principles and practices necessary for reasonably effective collaboration with accountants on problems requiring the work of both lawyers and accountants. The course is designed to develop in the student an understanding of how an accountant's work is used by top management in making decisions, by government in making and enforcing regulations, and by investors and lenders in exercising a discriminating choice in the employment of their funds. (Not offered in 1966-67.)

Negotiable Instruments. Study of the rules of the law merchant and the provisions of the Negotiable Instruments Law and the Uniform Commercial Code relating to the functions and legal incidents of checks, bills of exchange, promissory notes, and similar commercial instruments. 2 s.h. (spring). *Wetherington*

Sales. Study of the rules of the common law and the provisions of the various uniform acts and the Uniform Commercial Code relating to warranties, risks, remedies for breach, financing, and other legal problems arising in the sale of goods. 3 s.h. (fall). *Shimm*

Seminar in Regulated Industries. See Public Law Courses, page 34, for description.

Securities Regulation. See Public Law Courses, page 33, for description.

Trade Regulation. See Public Law Courses, page 34, for description.

Property Courses

Chattel Transactions. This course uses the field of Personal Property and the traditional title-passing rules of Sales to appraise judicial reasoning and legal concepts. It serves both as a low-level course in judicial methodology and an introduction to commercial law. It deals with possession and title of chattels, the bailment relationship, artisan's lien, transfer of chattels by gift and miscellaneous inter-vivos transactions. It does not go into details of enforcement of buyers' and sellers' rights or sales financing. 2 s.h. (fall). *Latty*

Land Use and Development. A survey of legislative, administrative, and judicial controls utilized to facilitate the orderly development and redevelopment of real property. This consideration will include public and private nuisance, zoning, subdivision control, housing codes, street mapping, and condemnation. The clash of individual and societal interests in land use is explored through cases involving the distinction between valid police power regulations and "takings" for public use which require payment of compensation. Problems of urban renewal, regional planning, and pollution of water and air will also receive consideration. 3 s.h. (fall). *Johnston*

Property I. The basic concepts of real property law and conveyancing. Historical background; estates in land, including the fee simple, the fee tail with its statutory substitutes, the life estate, the estate for years and other non-freeholds; concurrent ownership; types of future interests; conveyances before and after the Statutes of Uses; landlord and tenant; the modern deed—kinds, delivery, description, title covenants; covenants and agreements running with the land at law and in equity; easements; recording and title registration. 2 s.h. each semester. *Sparks*

Property II and Property III. The various rules and concepts governing transmission of property from one generation to another, including the materials normally covered in the traditional courses on Wills, Trusts and Future Interests. Historical background; intestate succession at common law and under modern statutes; limitations upon testamentary power; execution and revocation of wills; contest of wills; lapse, ademption and satisfaction; the nature, creation, elements, enforcement and administration of trusts; future interests, comprising reversions, remainders, executory interests, rights of entry, possibilities of reverter, and their

incidents; class gifts; powers of appointment; rule against perpetuities and other restrictions on the creation of interests; construction of wills, trusts and deeds. Property II (fall) and Property III (spring). [Students may take one or both semesters.] 3 s.h. (each semester). *Sparks and Johnston*

Security. Mortgage and security interests in real property, and suretyship. 3 s.h. (spring). *Wetherington*

Seminar in Tax and Estate Planning. Seminar devoted to problems and techniques of tax and estate planning. Enrollment limited. 2 s.h. (spring). *Johnston*

Public Law Courses

Administrative Law. The formulation of statutory schemes of administrative regulations: the organization of administrative agencies; the determination, promulgation and enforcement of administrative programs; the respective spheres of administrative and judicial responsibility; judicial control over administrative action. Practice and procedure before administrative agencies: informal conferences and negotiations; formal hearings; constitutional limitations. 3 s.h. (spring). *Gellhorn*

Seminar in Civil Liberties and Civil Rights. Studies in the field of personal liberties (freedom of speech, press, religion, association, etc.) and in the field of civil rights (right to non-discriminatory treatment, right to fairness in procedure, etc.). The seminar will be concerned with issues about which the law is unsettled, and especially with issues raised in cases pending before the Supreme Court of the United States. 2 s.h. (fall). *Wallace*

Constitutional Law. The distribution of and limitations upon governmental authority under the Constitution of the United States. Included are study of the doctrine of judicial review of legislative and executive action; the powers of Congress and the President; the limitations on State governmental powers resulting from the existence or exercise of Congressional power; and judicial protection against the exercise of governmental power in violation of rights, liberties, privileges, or immunities conferred by the Constitution. 3 s.h. (fall); 2 s.h. (spring). *Van Alstyne and Wallace*

Copyright and Unfair Competition. Legal problems arising in the production, marketing, and distribution of literary, artistic, musical, and related achievements. While the course will be concerned primarily with statutory and common law copyright, it will include study of the law of unfair competition, including legal protection of trade marks and trade names, and some comparison of copyright with the law of patents and design patents. 3 s.h. (spring). *Wallace*

Criminal Law and Procedure. An introductory study of the law of crimes and the administration of criminal justice; analysis of the criminal act and the mental element in crime; consideration of specific offenses as defined by statute and the common law; discussion of typical defenses in relation to specific crimes; study of the elements of Anglo-American criminal procedure. 2 s.h. (each semester). *Livengood*

Seminar in Criminal Law. Current problems in administering criminal justice, including studies of theory and technique in criminal procedure (investigation, prosecution and defense of criminal charges), inquiry into basic policy in the use of criminal sanctions for the promotion of public order, consideration of contemporary developments (legislative, judicial and administrative) in substantive and adjective criminal law, and analysis of specific problem areas such as mental responsibility, sexual deviation, attempts, and vicarious liability. 2 s.h. (fall). *Livengood*

Seminar in Criminal Procedure. Investigation of crime and the police practices pertinent thereto, including detention and arrest, interrogation, search and seizure; exclusionary rules of evidence; motions for continuance, change of venue, and challenges to the jury; problems of the indigent defendant; discovery problems in criminal trials; post-trial appellate procedures. 2 s.h. (spring). *Everett*

Federal Jurisdiction. A study of the federal courts with respect to the part played by them in achieving a workable federalism. Special attention will be given to the original jurisdiction of the federal district courts, the relationship of the federal courts to state courts and state law, and the permissible and desirable range of federal judicial power. 3 s.h. (spring). *Paschal*

Federal Taxation I. An introduction to federal taxation for those interested in that subject and a terminal course for those who are not but seek the minimum knowledge necessary to identify a tax problem. A detailed study of the basic concepts of the income tax is followed by a survey of some specialized tax areas, such as the income tax treatment of estates and trusts, partnerships, corporations, corporate distributions and adjustments and the federal estate and gift taxes. 3 s.h. (each semester). *Lowndes*

Federal Taxation II. The principal emphasis of the course is on the federal estate and gift taxes. Consideration is also given, however, to the related portions of the federal income tax dealing with the taxation of the income of estates and trusts and income in respect of a decedent. 3 s.h. (fall). *Lowndes*

Federal Taxation III. The course is concerned principally with the taxation of corporations and corporate distributions and adjustments under the federal income tax. Among the topics considered are how corporations are taxed, the organization of a corporation, the tax treatment of corporate distributions, redemptions and liquidations, collapsible corporations, the accumulated earnings and personal holding company taxes, subchapter S corporations, and corporate reorganizations and divisions, along with a

comparative study of the taxation of partners and partnerships. 3 s.h. (spring). *Lowndes*

International Economic Relations. Legal framework of U. S. foreign trade and investment; foreign trade and investment laws of selected foreign countries; function of international economic law; international economic agreements; problems of foreign trade and investments. 3 s.h. (spring). *Baade*

International Law. A survey of public international law of peace, as evidenced especially in decisions of national and of international courts; the drafting and interpretation of treaties; the nature of handling of international claims; the organization and jurisdiction of international tribunals, with special reference to the International Court of Justice; developments with respect to the codification of the law. 3 s.h. (fall). *Baade*

Labor Relations. A study of the law relating to collective bargaining and concerted labor activities, including the National Labor Relations Act and related legislation, the legal aspects of strikes, boycotts and picketing, the negotiation and administration of collective bargaining agreements, procedures for the settlement of labor disputes, and relations between the union and individual employees. 3 s.h. (fall). *Livengood*

Municipal Corporations. State legislative creation and control of local governmental units, municipal police power, limitations on taxation, indebtedness, and expenditures of funds, bond issues, tort liability, annexation, eminent domain, subdivision regulation, public housing, and urban renewal. 2 s.h. (fall). *Everett*

Securities Regulation. A study of the federal and state securities laws and the industry they govern, with emphasis on the mechanics and regulation of the distribution process and trading in securities; subjects dealt with include the functions of the Securities and Exchange Commission, registration and disclosure requirements and related civil liabilities, "blue sky" laws, proxy solicitation and reporting requirements, broker-dealer regulation, the self-regulatory functions of the exchanges and the regulation of investment companies. 3 s.h. (spring). *Havighurst*

Seminar in Labor Law. An intensive examination of significant problems in collective bargaining, union-management relations and labor dispute settlement, with emphasis upon the drafting and interpretation of contract clauses, theories and techniques in contract negotiation, grievance handling, voluntary arbitration and other procedures for the adjustment of disputes, and the inter-relation of the legal and economic aspects of labor problems. 2 s.h. (spring). *Livengood*

Seminar in Legislation. Studies in the legislative process and in the drafting and interpretation of statutes. Included will be exercises in legislative drafting in addition to study of selected materials on such subjects as lobbying, legislative procedures, legislative investigations, legislative-administrative relations, and statutory interpretation. 2 s.h. (fall). *Paschal*

Seminar in Military Law. A study of military jurisdiction, the rights of military personnel, the body of both substantive and procedural law that has developed under the Uniform Code of Military Justice; in addition to its other goals, the seminar will seek to develop skills in statutory interpretation and to encourage comparisons between civilian and military criminal law administration. 2 s.h. (fall). *Everett*

Seminar in Regulated Industries. Selected studies of government economic regulation in such regulated industries as transportation, broadcasting, and power, plus directed research and writing in specific problems of trade regulation. (Not offered in 1966-67.)

Seminar in Urban Renewal. A study of the urban renewal program, as implemented at the federal and local levels. Extensive field work is planned and urban renewal officials will meet with members of the seminar to discuss problems of implementing an urban renewal program. 1 s.h. (spring). *Everett*

Social Legislation. Contemporary public welfare law, with emphasis on government regulation of conditions of employment, including the Fair Labor Standards Act and other wage-hour and child-labor statutes, unemployment insurance and other social security legislation, employers' liability and workmen's compensation acts, and related laws establishing minimum standards for the creation, continuance and termination of the employment relationship. In addition to other objectives, the course will seek to develop skills in legislative advocacy and procedure, and in the drafting and interpretation of statutes. 2 s.h. (spring). *Livengood*

Seminar in Tax and Estate Planning. See Property Courses, page 31, for description.

State and Local Taxation. Constitutional limitations on the taxing power; jurisdiction to tax; state excise taxes; and the general property tax. (Not offered in 1966-67.)

Trade Regulation. A study of the federal antitrust laws and their common law background, with emphasis on the economic policies involved, and of specific unfair trade practices and unlawful restraints at common law and under state and federal statutes. Attention is given to a critical examination of legislation designed to enforce competition as the primary control of the economic system; legal measures that supplement or replace competition; the relation of patents and antitrust; price discrimination; fair trade laws; regulation of advertising; trademarks and trade-names; appropriation of trade values; boycotts; and disparagement. 3 s.h. (fall). *Havighurst*

Seminar in Workmen's Compensation. The main elements of Workmen's Compensation Law of the United States are covered through the assignment of typical office problems on which legal memoranda or opinions are prepared. 2 s.h. (fall). *Larson*

Seminar in World Law. The emphasis of this course is on those aspects of national law and international law which have an important influence

on weakening or strengthening a world legal order. The course does not duplicate the material in the regular course on International Law. 2 s.h. (spring). *Larson*

Seminar in International Organizations. This course covers the principal legal questions, including current controversies, affecting the United Nations or growing out of the United Nations Charter. (Not offered in 1966-67.)

General Courses

Admiralty. The special body of law governing maritime affairs, especially the transportation of goods and passengers by water. Admiralty jurisdiction; marine insurance; carriage of goods; charter parties; general average; rights of injured seamen and others; collision; salvage; maritime liens and ship mortgages; limitation of liability; governmental activity in shipping. 3 s.h. (spring). *Wetherington*

Comparative Law. An examination and comparison of the law of selected jurisdictions on certain specific topics. The history, sources, and methods of the civil law will be investigated, discussed, and compared with those of common law countries. (Not offered in 1966-67.)

Conflict of Laws. A study of the special problems which arise when the significant facts of a case are connected with more than one jurisdiction. Recognition and effect of foreign judgments; choice of law; federal courts and conflict of laws; the United States Constitution and conflict of laws. 3 s.h. (spring). *Baade*

Equitable Remedies. A survey of equitable remedies in general (including enforcement of equity decrees) and of important parts of the fields of equity and restitution that are not covered in other courses. (Not offered in 1966-67.)

Family Law. Marriage; annulment; divorce; separation; property rights. 2 s.h. (fall). *Baade*

Jurisprudence. Discussion of some of the basic problems of classical and contemporary juristic theory, with applications to cases and statutes. Open to all graduate students, and, with the consent of the instructor, to qualified second and third year students. (Not offered in 1966-67.)

Legal History. A study of the development of fundamental English and American legal institutions, with primary emphasis upon the establishment and growth of American law from the colonial period to the present. (Not offered in 1966-67.)

The Legal Process. A study of problems in the making and application of law and of the institutions for solving those problems. This has been called a course in "working jurisprudence." It deals with major jurisprudential concepts, not in the abstract but in an attempt to put them to

work in the solution of specific legal problems. The problems cut across conventional course lines and include not only those confronted by courts, but also those confronted by private persons and their counsel, legislatures, administrative agencies, public officials, and others. (Not offered in 1966-67.)

North Carolina Statutes and Decisions. A study of selected statutes of North Carolina with discussion of their application, and an analysis of the decisions of the Supreme Court of North Carolina construing them. 2 s.h. (spring). *Bryson*

Patent Law. A short survey of the law relating to patents and trademarks, with some coverage of copyrights, primarily to give the general practitioner a foundation in these areas to collaborate effectively with specialists. Special attention is given to overlapping problems in above-mentioned areas. (Not offered in 1966-67.)

Torts. The bases of liability in damages for personal injuries and injuries to property; bases other than fault; negligence; intentional infliction of harm. Procedure in jury trials; proof of negligence; causation and "proximate cause"; defenses. Special rules applicable to occupiers and owners of land, motor vehicle accidents, suppliers of goods and remote contractors. Misrepresentation and fraud; defamation; assault and battery; false imprisonment. 3 s.h. (fall); 2 s.h. (spring). *Hardin*

Procedure and Practice Courses

Civil Procedure. A study of the adjudication of civil cases with special emphasis on the Federal Rules of Civil Procedure. 3 s.h. (each semester). *Paschal*

Evidence. A study of the common-law rules of evidence, including the requirements of relevancy and materiality; competency and privilege of witnesses, examination and cross-examination, burden of proof and presumptions, judicial notice, and functions of judge and jury. 3 s.h. (fall). *Strong*

Legal Profession. Lectures, discussions, and reading concerning the ethical problems and professional responsibilities of the lawyer. 1 s.h. (spring). *Hardin*

North Carolina Practice. A study of the steps in a civil action at law from the issuance of process to the entry of final judgment including service of process; appearance and waiver of process; selecting the jury; various motions made during the trial; submission of case to jury; verdict; judgment; noting and perfecting appeal. Also included are such topics as jurisdiction of various courts in North Carolina; venue; trials without a jury; provisional remedies and special proceedings. 2 s.h. (fall). *Bryson*

Trial Practice. A study of the function of the advocate in the trial of law suits, with emphasis upon methods of pre-trial preparation and development of facts in court, typical uses of rules of procedural and substantive law in trial proceedings, and tactical and ethical aspects of problems which confront the trial lawyer. The course is open to third-year students who have completed the course in Evidence. 2 s.h. (spring).
Hardin and Strong

Legal Research and Writing

Duke Law Journal. One semester-hour of credit shall be accorded for each semester of satisfactory *Law Journal* activity as a competitor or as a member of the Editorial Board other than an officer; two semester-hours of credit shall be accorded for each semester of satisfactory *Law Journal* activity as an officer of the Editorial Board.

Research and Writing. Classroom instruction and individual problems in the use of law books, the preparation of memorandum of law, and moot court briefing and argument. 1 s.h. (each semester). *Johnston*

Upon recommendation of the Committee on Graduate Study, seminars not listed in the Bulletin may be created or arrangements made for supervision of special research by individual graduate students in any subject.

All matters presented in this Bulletin are subject to change as the University or the School of Law may deem expedient.

Enrollment 1965-1966

First Year

Abbott, Charles M. (University of Wyoming), Scottsbluff, Nebraska
Adams, Kenneth A. (Harvard University), Gadsden, Alabama
Alexander, Bruce D. (Yale University), West Hartford, Connecticut
Angelini, Michael P. (Wesleyan University), Leominster, Massachusetts
Assini, Frederick W. (Holy Cross), Koppel, Pennsylvania
Attkisson, Jerry B. (Wake Forest College), Kinston, North Carolina
Bianchi, Carl F. (Hamilton College), Rochester, New York
Bibeau, Brian H. (Florida State University), Clearwater, Florida
Boroughs, Paul T. (University of South Carolina), Dillon, South Carolina
Bouknight, Jacob A. (Wofford College), Lamar, South Carolina
Breitveiser, William S. (Princeton University), Durham, North Carolina
Britton, Christopher Q. (University of Iowa), Lehigh, Iowa
Brooks, Donald B. (Duke University), Moorestown, New Jersey
Brown, Garrett E. Jr. (Lafayette College), Upper Montclair, New Jersey
Brownell, John R. (Catawba College), Westfield, New Jersey
Bruce, Laurie B. (Tufts University), Beverly, Massachusetts
Burton, Charles B. (Stanford), Phoenix, Arizona
Carberry, John G. (Yale University), Phillipsburg, New Jersey
Carstetter, David W. (Pennsylvania State University), Reedsville, Pennsylvania
Charleston, Joel S. (University of Toledo), Oceanside, New Jersey
Clarke, Thomas J. (University of Iowa), Des Moines, Iowa
Cooke, Edmund D. Jr. (Kent State University), Springfield, Ohio
Davenport, Gary L. (Duke University), Paris, France
Dickerman, Stephen G. (Union College), Maplewood, New Jersey
Dunck, Thomas H. Jr. (Wabash College), Belleville, Illinois
Eason, William E. Jr. (Duke University), Four Oaks, North Carolina
Ferguson, Henry L. (Williams College), Fishers Island, New York
Ford, Paul B. Jr. (Boston College), Hamden, Connecticut
Foss, Stuart M. (New York University), Wilbraham, Massachusetts
Fox, Robert C. (University of Minnesota), Hopkins, Minnesota
Frey, Robert I. (Colorado State University), Evanston, Illinois
Garro, Robert K. (Monmouth College), Skokie, Illinois
Gates, Gilbert L. (Duke University), High Point, North Carolina
Goff, Ernest L. (Dartmouth College), Rehoboth, Massachusetts
Greener, Ralph B. (Wheaton College), Peoria, Illinois
Hamilton, Geoffrey (Wooster), Hastings-on-Hudson, New York
Hancock, William G. Jr. (University of North Carolina), Charlotte, North Carolina

Hardin, J. Michael (University of Pennsylvania), Louisville, Kentucky
 Harkness, Andrew M. (Colgate University), Canandaigua, New York
 Harlow, David A. (Lehigh University), West Orange, New Jersey
 Hatcher, James L. Jr. (Howard University), Washington, D.C.
 Hieronymus, Edward W. (Knox College), Colorado Springs, Colorado
 Hughes, Randall L. (University of Florida), Auburndale, Florida
 Hutchison, Stuart N. III (Lafayette College), Pittsburgh, Pennsylvania
 Ingraham, Charles O. (Colgate University), Endwell, New York
 Jeffers, Fulton P. (University of Maryland), Salisbury, Maryland
 Johnson, Carl E. Jr. (Oberlin College), Morgantown, West Virginia
 Jonas, Richard E. (University of North Carolina), Lincolnton, North Carolina
 Jones, Richard V. (Yale University), Hasbrouck Heights, New Jersey
 Karmazyn, Basil W. (University of Connecticut), Wapping, Connecticut
 Kearns, Peter F. (Brown University), Manchester, New Hampshire
 Keenan, James E. (Carleton College), Lake Forest, Illinois
 Kelly, James H. (Davidson College), Conover, North Carolina
 Kendig, James J. (University of the South), Fairborn, Ohio
 Kimbrough, Lawrence M. (Davidson College), Davidson, North Carolina
 Kirby, John D. (Carleton College), Urbana, Illinois
 Kissam, Roger H. (Duke University), Rumson, New Jersey
 Kittrell, Rosemary (Agnes Scott College), Columbia, South Carolina
 Lambeth, Walter O. Jr. (Duke University), Edenton, North Carolina
 Lawson, David H. (Duke University), Perry, Georgia
 Ledbetter, Clarence L. (Hampton Institute), Dunn, North Carolina
 Leermakers, Stephen W. (Wesleyan University), Rochester, New York
 Lyon, Carl F. Jr. (Duke University), Sumter, South Carolina
 McGaughey, Ralph L. (Assumption College), Saugus, Massachusetts
 McGowan, James P. (Notre Dame University), Elyria, Ohio
 McKee, Thomas J. (Princeton University), Blauvelt, New York
 Malinzak, Edward (Western Reserve University), Vestaburg, Pennsylvania
 Marquis, Robert S. (Davidson College), Knoxville, Tennessee
 Mast, Kent E. (Princeton University), Lima, Pennsylvania
 Maxwell, Robert W. II (Hamden-Sydney), Waynesburg, Pennsylvania
 Meadors, Marilyn E. (Duke University), Cincinnati, Ohio
 Messinger, Donald H. Jr. (Colgate University), Clyde, New York
 Miller, Martin J. (Colgate University), St. Petersburg, Florida
 Moeling, Walter G. IV (Duke University), Alexander City, Alabama
 Moore, Fred H. (Duke University), Lookout Mountain, Tennessee
 Murphy, Thomas H. (Colorado State University), Denver, Colorado
 Palmer, Stephen H. (University of Pennsylvania), Wayne, Pennsylvania
 Patton, William L. (Yale University), Hamden, Connecticut
 Pepe, Stephen P. (Montclair State College), Montclair, New Jersey
 Piatt, William M. IV (Principia College), Durham, North Carolina
 Pierson, Stuart F. (Hobart College), Washington, D.C.
 Pinna, William P. (De Paul University), Chicago, Illinois
 Rather, Gordon S. Jr. (Vanderbilt University), Little Rock, Arkansas
 Reilly, Edward A. (Princeton University), Brooklyn, New York
 Rohvedder, James L. (University of Iowa), Memphis, Tennessee
 Rollins, Overman R. (Duke University), Morganton, North Carolina
 Romp, Thomas L. (Duke University), Vermilion, Ohio
 Rose, Charles P., Jr. (Duke University), Henderson, North Carolina
 Safley, James R. (University of Iowa), Cedar Rapids, Iowa
 Sampsel, Charles F. (Gettysburg College), Bristol, Pennsylvania
 Saxer, Philip D. (University of Maine), Bangor, Maine
 Scofield, Michael S. (North Carolina State University), Princeton, New Jersey

Seibert, Henry E. IV (Princeton University), Columbus, Ohio
 Settlemyer, William B. (Duke University), Short Hills, New Jersey
 Shearin, Ronald V. (Duke University), Warrenton, North Carolina
 Shenkin, Robert J. (University of Michigan), Wynnewood, Pennsylvania
 Shenkman, Jerrold (University of Florida), Brooklyn, New York
 Simpson, Robert L. Jr. (Duke University), Jacksonville, Florida
 Smith, James L. III (Dartmouth College), Fayetteville, Arkansas
 Spaulding, Bernard J. (Alma College), Grand Rapids, Michigan
 Stewart, William R. (Yale University), Cleveland, Ohio
 Taylor, Joe T. III (Duke University), Salisbury, North Carolina
 Torres, Ernest C. (Dartmouth College), New Bedford, Massachusetts
 Traver, E. Clifton (Cornell University), Great Neck, New York
 Volz, Marlin M. Jr. (Duke University), Louisville, Kentucky
 Voran, Brice T. (Yale University), Muncie, Indiana
 Wagner, Lynn E. (Drexel Institute), Maple Shade, New Jersey
 Walker, John R. (Virginia Military Institute), Memphis, Tennessee
 Weistart, John C. (Illinois Wesleyan University), Minonk, Illinois
 Wirtz, Frederick R. (Knox College), Chicago, Illinois
 Wright, William F. (University of Nebraska), Lincoln, Nebraska

Second Year

Adams, Charles F. (Duke University), Java, Virginia
 Adams, James A. (Duke University), Roscoe, New York
 Atwater, Luther E. (Duke University), Columbia, South Carolina
 Auerbach, Kenneth R. (Trinity College), Rye, New York
 Bacon, Richard G. (Villanova University), Wilmington, Delaware
 Banks, Lawrence K. (Duke University), Greensboro, North Carolina
 Barr, Stuart G. (Duke University), Staten Island, New York
 Barrier, W. Christopher (Hendrix College), Little Rock, Arkansas
 Beach, Lawrence W. (Bowdoin College), Sylvan, New York
 Bernard, Daniel F. (Iowa State University), Kenton, Ohio
 Berteau, John T. (Duke University), Lake Jem, Florida
 Bolch, Carl E. Jr. (University of Pennsylvania), Jacksonville, Florida
 Brannen, George (Dartmouth College), Geneva, Illinois
 Burkhardt, Clyde A. (Brown University), Southington, Connecticut
 Burton, Robert E. Jr. (Dartmouth College), Montchanin, Delaware
 Campbell, Frank A. Jr. (Duke University), Clearwater, Florida
 Campbell, George R. (Harvard University), Parkersburg, West Virginia
 Carter, Norman M. Jr. (Rutgers University), Plainfield, New Jersey
 Chiles, Stephen M. (Davidson College), Nokomis, Florida
 Clark, Roger M. (University of Utah), Hagerstown, Maryland
 Collier, Calvin (Grinnell College), Berwyn, Illinois
 Collins, Patrick H. (Colgate University), Gouverneur, New York
 Constangy, William (Wake Forest College), Atlanta, Georgia
 Cooper, Norman G. (The Citadel), Bethesda, Maryland
 Craven, Donald B. (University of North Carolina), Roxboro, North Carolina
 Craven, James B. III (University of North Carolina), Morganton, North Carolina
 Crill, John L. (Allegheny College), Mercer, Pennsylvania
 Davis, Linwood L. (Princeton University), Winston-Salem, North Carolina
 Davis, William A. II (University of North Carolina), High Point, North Carolina
 Dawson, Grayce B. (Duke University), Durham, North Carolina
 Dillon, W. Lyman (Davidson College), High Point, North Carolina
 Faulkner, Douglas A. (Earlham College), Ho-Ho-Kus, New Jersey
 Fink, Joseph A. (Oberlin College), Detroit, Michigan

Fromholz, Haley J. (New York University), Darien, Connecticut
 Genders, Curtis D. (Florida State University), Sarasota, Florida
 Gordon, Richard A. (New York University), West Hempstead, L. I., New York
 Gormley, Thomas J. (Amherst College), Hartford, Connecticut
 Grissom, Hubert A. Jr. (Birmingham-Southern College), Cullman, Alabama
 Guthrie, George G. (Duke University), Charleston, West Virginia
 Hackett, Robert J. (Rutgers University), Allendale, New Jersey
 Hale, John S. (Ohio University), Cincinnati, Ohio
 Hamilton, J. Robert (Wabash College), Crawfordsville, Indiana
 Harrison, Frederick (Davidson College), Little Rock, Arkansas
 Hazen, Edwin R. (Lehigh University), Erie, Pennsylvania
 Heinly, James F. (Gettysburg College), Lancaster, Pennsylvania
 Hopper, Frederick C. (Beloit College), Taylorsville, Illinois
 Hunter, Robert C. (University of Pittsburgh), Pittsburgh, Pennsylvania
 Johnson, Hervey M. (Princeton University), Lumberton, North Carolina
 Johnson, Robert A. (Duke University), Hopewell, Virginia
 Jorgensen, Thomas A. (Columbia University), Silow Springs, Maryland
 Keating, Robert (Georgetown University), Brooklyn, New York
 Klingelhofer, Stephan E. (Yale University), Bethesda, Maryland
 Kuter, Stanley J. (Fordham University), Port Chester, New York
 Lathrop, Peter K. (Hamilton College), Ellenville, New York
 Lewis, Emmett B. III (Duke University), Akron, Ohio
 Lewis, John H. (University of Florida), Orlando, Florida
 Lincoln, Donald R. (Cornell University), Attica, New York
 Livingston, Farrand M. (Kenyon College), Worthington, Ohio
 Lockwood, John A. (Colby College), Wilmington, Delaware
 McArthur, Matthew R. (Knox College), Park Forest, Illinois
 McCoy, Terrence L. (Dartmouth College), Louisville, Kentucky
 Mahoney, George R. Jr. (Ohio Wesleyan University), Southhampton, L.I., New York
 Melton, Thomas H. (Duke University), Huntington, West Virginia
 Meyers, David (Tulane University), St. Petersburg, Florida
 Moran, Charles A. (Georgetown University), Columbia, South Carolina
 Moye, Robert J. (Washington and Lee University), Arlington, Virginia
 Mullen, James N. (Duke University), Gastonia, North Carolina
 Nabers, Wallace J. (Duke University), Wilson, North Carolina
 Nathanson, Paul S. (Tulane University), North Miami, Florida
 Norfolk, William R. (Miami University), Cincinnati, Ohio
 Pancoast, David W. (College of Wooster), Lambertville, Michigan
 Parker, Thomas (Davidson College), Greenville, South Carolina
 Pieper, Nathaniel G. W. (Washington University), Coeur D'Alene, Idaho
 Poe, Douglas (DePauw University), Flossmoor, Illinois
 Remsburg, F. Raine (University of North Carolina), Goldsboro, North Carolina
 Rich, Wayne A. Jr. (Colgate University), Charleston, West Virginia
 Rieder, Robert W. Jr. (Willamette University), Portland, Oregon
 Riffe, Alan E. (Stetson University), DeLand, Florida
 Riley, William L. (Williams College), Garden City, New York
 Rogers, William K. (University of Arizona), Tucson, Arizona
 Roth, Steven M. (Pennsylvania State University), Elkins Park, Pennsylvania
 Semonche, John (Brown University), Chapel Hill, North Carolina
 Serterides, Louis (Rutgers University), Jersey City, New Jersey
 Sheahan, Robert E. (Illinois Wesleyan), Riverdale, Illinois
 Sheffield, Homer G. (Duke University), Columbia, South Carolina
 Shelfer, William S. Jr. (North Georgia College), Atlanta, Georgia
 Sherman, Roger (Princeton University), Warrington, Florida
 Singer, William B. (Georgetown University), Cincinnati, Ohio

Smith, Hugh N. (Lawrence College), Delaware, Ohio
 Smith, Lanty L. (Wittenberg University), Sherrodsville, Ohio
 Steinbrink, William H. (Wittenberg University), Richmond, Indiana
 Street, Malcolm B. Jr. (Birmingham-Southern College), Anniston, Alabama
 Stronach, George T. III (Atlantic Christian College), Wilson, North Carolina
 Stubbs, Trawick H. Jr. (University of North Carolina), Atlanta, Georgia
 Taylor, John C. (Juniata College), Huntington, Pennsylvania
 Thomasch, Roger P. (College of William and Mary), Philadelphia, Pennsylvania
 Todd, Daryl F. (University of Pennsylvania), Beach Haven, New Jersey
 Tracy, W. Ferber (Duke University), Salisbury, Connecticut
 Vieregg, Arthur B. (Duke University), Arlington, Virginia
 Ward, Mitchell E. III (University of Mississippi), Vicksburg, Mississippi
 Warnick, Reed T. (Brigham Young University), Wheatridge, Colorado
 Wehrle, Richard T. (Duke University), Charlotte, North Carolina
 Wildermuth, John G. (United States Military Academy), Ft. Bragg, North Carolina
 Williams, Terry L. (Ball State Teachers College), Anderson, Indiana
 Womble, William F. Jr. (Duke University), Winston-Salem, North Carolina
 Yule, Dennis D. (Seattle Pacific College), Shelton, Washington

Third Year

Adelson, Andrew E. (Washington and Lee University), Baltimore, Maryland
 Albert, Burton L. (Dartmouth College), Sioux City, Iowa
 Allen, Richard, M. (Purdue University), Park Ridge, Illinois
 Alsentzer, William J. (Duke University), Wilmington, Delaware
 Anderson, Bruce H. (Duke University), Thomasville, Georgia
 Axelrod, Charles D. (Colgate University), Bellmore, New York
 Bader, W. Reece (Williams College), Portland, Oregon
 Baier, Alan L. (Williams College), Bellport, New York
 Benson, George J. (Lafayette College), New Shrewsbury, New Jersey
 Blanco, David B. (Duke University), Winston-Salem, North Carolina
 Bloom, David W. (University of South Carolina), Columbia, South Carolina
 Branch, Barrington H. (Davidson College), Atlanta, Georgia
 Brooks, Earle L. (Miami University), Columbus, Ohio
 Buhrman, Richard W. (University of Chattanooga), Chattanooga, Tennessee
 Cabe, Robert D. (Hendrix College), Benton, Arkansas
 Cairns, John A. (Carleton College), Greenville, Delaware
 Carson, J. Van (Mount Union College), Canton, Ohio
 Cawood, Harry E. (Wheaton College), Newton, Iowa
 Connard, Carroll S. (Williams College), New Hope, Pennsylvania
 Conroy, Dale D. (Duke University), Bethpage, New York
 Courter, James A. (Colgate University), Essex Falls, New Jersey
 Davis, R. Kennedy (Ohio Wesleyan University), Findlay, Ohio
 Denson, Alexander B. (North Carolina State University), Richmond, Virginia
 Denson, Christine Y. (Millikin University), Keokuk, Iowa
 Detrick, Judson W. (DePauw University), LaGrange, Illinois
 Etz, Winton O. Jr. (Miami University), Xenia, Ohio
 Evans, John E. (University of Louisville), Wyomissing, Pennsylvania
 Faris, James (Duke University), Muncie, Indiana
 Feinstein, Miles R. (Rutgers University), Camden, New Jersey
 Field, Michael W. (Georgetown University), Washington, D.C.
 Fink, Jerold A. (Duke University), Dayton, Ohio
 Fowlkes, Hal T. Jr. (Millsaps College), Wiggins, Mississippi
 Fox, Henry H. (Florida State University), Miami, Florida
 Ganotis, John (Syracuse University), Jamesville, New York

Gaskins, Eura DuVal Jr. (Wake Forest College), Monroe, North Carolina
 George, Robert M. (North Carolina State University), Mercer Island, Washington
 Gilley, Dewey C. Jr. (Davidson College), Leaksville, North Carolina
 Gold, Peter S. (Duke University), Shelby, North Carolina
 Goodson, J. Michael (Duke University), Mt. Olive, North Carolina
 Haddon, Harold A. (Albion College), Fenton, Michigan
 Harrington, Anthony S. (University of North Carolina), Charlotte, North Carolina
 Harriss, William G. (University of North Carolina), Burlington, North Carolina
 Hart, William J. (Drury College), Republic, Missouri
 Hawke, Russell J. Jr. (Drew University), Endwell, New York
 Hayes, L. Mifflin (Kenyon College), Rahway, New Jersey
 Hedden, Andrew S. (Hamilton College), Short Hills, New Jersey
 Heiser, Lawrence C. (University of Southern California), Santa Monica, California
 Hillman, George A. (Yale University), Batesville, Indiana
 Holmes, William K. (Augustana College), Wataga, Illinois
 Horsch, Christopher J. (University of the South), Newnan, Georgia
 House, Donald R. (Duke University), Monroe, North Carolina
 Howe, Jonathan T. (Northwestern University), Des Plaines, Illinois
 Huber, John L. (Dartmouth College), Pittsburgh, Pennsylvania
 Hunoval, Mathias P. (Lehigh University), South Orange, New Jersey
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